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Dated

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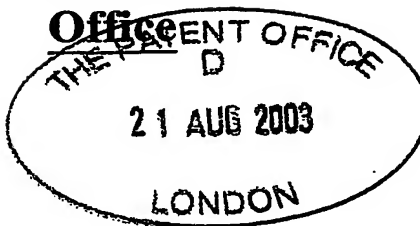
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1/77

Request for grant of a patent

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22AUG03 E832176-1 002029
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1. Your Reference	APB/P33108 P3		
2. Patent application number (The Patent office will fill in this part)	21 AUG 2003		
3. Full name, address and postcode of the or of each applicant (underline all surnames)	GLAXO GROUP LIMITED GLAXO WELLCOME HOUSE BERKELEY AVENUE GREENFORD MIDDLESEX UB6 ONN GB		
00472587003 Patents ADP number (if you know it)			
If the applicant is a corporate body, give the country/state of its corporation	GB		
4. Title of the invention	Compounds		
5. Name of your agent (if you know one)	Judith Pritchard		
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode) Patents ADP number (if you know it)	GLAXOSMITHKLINE CORPORATE INTELLECTUAL PROPERTY 980 GREAT WEST ROAD BRENTFORD, MIDDLESEX TW8 9GS, GB		
6. If you are declaring priority from one or more earlier patent applications, give the country and date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of Filing (day / month / year)
		08489122001	
7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day / month / year)	
8. Is a statement of inventorship and of right to grant a patent required in support of this request? (Answer yes if:			
a) any applicant named in part 3 is not an inventor, or			
b) there is an inventor who is not named as an applicant, or			
c) any named applicant is a corporate body.			

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Patents Form 1/77

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Description	224
Claim(s)	43
Abstract	1
Drawing(s)	-

10. If you are also filing any of the following, state how many against each item

Priority Documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patent Form 9/77*)

Request for substantive examination (*Patent Form 10/77*)

Any other documents (please specify) Form 23/77 + Fee Sheet

11. I/We request the grant of a patent on the basis of this application

Judith Pritchard

Signature JUDITH PRITCHARD 21 AUGUST 2003
AGENT FOR THE APPLICANTS

12. Name and daytime telephone number of person to contact in the United Kingdom
Anthony Breen
01438 76 2055

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a) Notes

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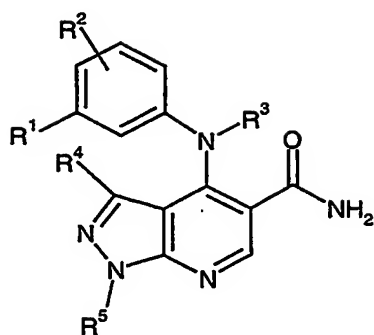
c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form
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COMPOUNDS

- The present invention relates to pyrazolopyridine compounds, processes for their preparation, intermediates usable in these processes, and pharmaceutical compositions containing the compounds. The invention also relates to the use of the pyrazolopyridine compounds in therapy, for example as inhibitors of phosphodiesterases and/or for the treatment and/or prophylaxis of inflammatory and/or allergic diseases such as chronic obstructive pulmonary disease (COPD), asthma or allergic rhinitis.
- 10 US 3,979,399, US 3,840,546, and US 3,966,746 (E.R.Squibb & Sons) disclose 4-amino derivatives of pyrazolo[3,4-b]pyridine-5-carboxamides wherein the 4-amino group NR₃R₄ can be an acyclic amino group wherein R₃ and R₄ may each be hydrogen, lower alkyl (e.g. butyl), phenyl, etc.; NR₃R₄ can alternatively be a 3-6-membered heterocyclic group such as pyrrolidino, piperidino and piperazino. The compounds are disclosed as
- 15 central nervous system depressants useful as ataractic, analgesic and hypotensive agents.
- US 3,925,388, US 3,856,799, US 3,833,594 and US 3,755,340 (E.R.Squibb & Sons) disclose 4-amino derivatives of pyrazolo[3,4-b]pyridine-5-carboxylic acids and esters. The 4-amino group NR₃R₄ can be an acyclic amino group wherein R₃ and R₄ may each
- 20 be hydrogen, lower alkyl (e.g. butyl), phenyl, etc.; NR₃R₄ can alternatively be a 5-6-membered heterocyclic group in which an additional nitrogen is present such as pyrrolidino, piperidino, pyrazolyl, pyrimidinyl, pyridazinyl or piperazinyl. The compounds are mentioned as being central nervous system depressants useful as ataractic agents or tranquilisers, as having antiinflammatory and analgesic properties. The
- 25 compounds are mentioned as increasing the intracellular concentration of adenosine-3',5'-cyclic monophosphate and for alleviating the symptoms of asthma.
- H. Hoehn et al., *J. Heterocycl. Chem.*, 1972, 9(2), 235-253 discloses a series of 1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid derivatives with 4-hydroxy, 4-chloro,
- 30 4-alkoxy, 4-hydrazino, and 4-amino substituents.
- CA 1003419, CH 553 799 and T.Denzel, *Archiv der Pharmazie*, 1974, 307(3), 177-186 disclose 4,5-disubstituted 1H-pyrazolo[3,4-b]pyridines unsubstituted at the 1-position.
- 35 Japanese laid-open patent application JP-2002-20386-A (Ono Yakuhin Kogyo KK) published on 23 January 2002 discloses pyrazolopyridine compounds of the following formula:



JP-2002-20386-A
(Ono)

wherein R^1 denotes 1) a group $-OR^6$, 2) a group $-SR^7$, 3) a C2-8 alkynyl group, 4) a nitro group, 5) a cyano group, 6) a C1-8 alkyl group substituted by a hydroxy group or a C1-8 alkoxy group, 7) a phenyl group, 8) a group $-C(O)R^8$, 9) a group $-SO_2NR^9R^{10}$, 10) a group $-NR^{11}SO_2R^{12}$, 11) a group $-NR^{13}C(O)R^{14}$ or 12) a group $-CH=NR^{15}$. R^6 and R^7 denote i) a hydrogen atom, ii) a C1-8 alkyl group, iii) a C1-8 alkyl group substituted by a C1-8 alkoxy group, iv) a trihalomethyl group, v) a C3-7 cycloalkyl group, vi) a C1-8 alkyl group substituted by a phenyl group or vii) a 3-15 membered mono-, di- or tricyclic hetero ring containing 1-4 nitrogen atoms, 1-3 oxygen atoms and/or 1-3 sulphur atoms.

R^2 denotes 1) a hydrogen atom or 2) a C1-8 alkoxy group. R^3 denotes 1) a hydrogen atom or 2) a C1-8 alkyl group. R^4 denotes 1) a hydrogen atom, 2) a C1-8 alkyl group, 3) a C3-7 cycloalkyl group, 4) a C1-8 alkyl group substituted by a C3-7 cycloalkyl group, 5) a phenyl group which may be substituted by 1-3 halogen atoms or 6) a 3-15 membered mono-, di- or tricyclic hetero ring containing 1-4 nitrogen atoms, 1-3 oxygen atoms and/or 1-3 sulphur atoms. R^5 denotes 1) a hydrogen atom, 2) a C1-8 alkyl group, 3) a C3-7 cycloalkyl group, 4) a C1-8 alkyl group substituted by a C3-7 cycloalkyl group or 5) a phenyl group which may be substituted by 1-3 substituents. In group R^3 , a hydrogen atom is preferred. In group R^4 , methyl, ethyl, cyclopropyl, cyclobutyl or cyclopentyl are preferred. The compounds of JP-2002-20386-A are stated as having PDE4 inhibitory activity and as being useful in the prevention and/or treatment of inflammatory diseases and many other diseases.

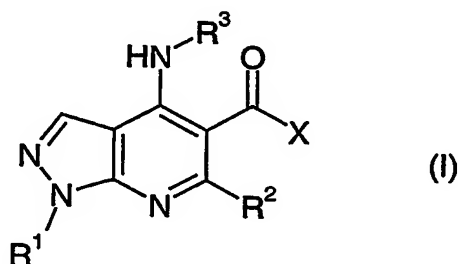
EP 0 076 035 A1 (ICI Americas) discloses pyrazolo[3,4-b]pyridine derivatives as central nervous system depressants useful as tranquilisers or ataractic agents for the relief of anxiety and tension states.

The compound cartazolate, ethyl 4-(n-butylamino)-1-ethyl-1H-pyrazolo[3,4-b]-pyridine-5-carboxylate, is known. J.W. Daly et al., *Med. Chem. Res.*, 1994, 4, 293-306 and D. Shi et al., *Drug Development Research*, 1997, 42, 41-56 disclose a series of 4-(amino)substituted 1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid derivatives, including ethyl 4-cyclopentylamino-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate, and their affinities and antagonist activities at A_1 - and A_{2A} -adenosine receptors, and the latter paper discloses their affinities at various binding sites of the $GABA_A$ -receptor channel. S. Schenone et al., *Bioorg. Med. Chem. Lett.*, 2001, 11, 2529-2531 and F. Bondavalli et

al., *J. Med. Chem.*, 2002, vol. 45 (Issue 22, 24 October 2002, allegedly published on Web 09/24/2002), pp. 4875-4887 disclose a series of 4-amino-1-(2-chloro-2-phenylethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid ethyl esters as A₁-adenosine receptor ligands.

- 5 WO 02/060900 A2 appears to disclose, as MCP-1 antagonists for treatment of allergic, inflammatory or autoimmune disorders or diseases, a series of bicyclic heterocyclic compounds with a -C(O)-NR⁴-C(O)-NR⁵R⁶ substituent, including isoxazolo[5,4-b]pyridines and 1H-pyrazolo[3,4-b]pyridines (named as pyrazolo[5,4-b]pyridines) with the -C(O)-NR⁴-C(O)-NR⁵R⁶ group as the 5-substituent and optionally substituted at the
10 1-, 3-, 4-, and/or 6-positions. Bicyclic heterocyclic compounds with a -C(O)NH₂ substituent instead of the -C(O)-NR⁴-C(O)-NR⁵R⁶ substituent are alleged to be disclosed in WO 02/060900 as intermediates in the synthesis of the -C(O)-NR⁴-C(O)-NR⁵R⁶ substituted compounds.
- 15 It is desirable to find new compounds which bind to, and preferably inhibit, phosphodiesterase type IV (PDE4).

The present invention provides a compound of formula (I) or a salt thereof (in particular, a pharmaceutically acceptable salt thereof):

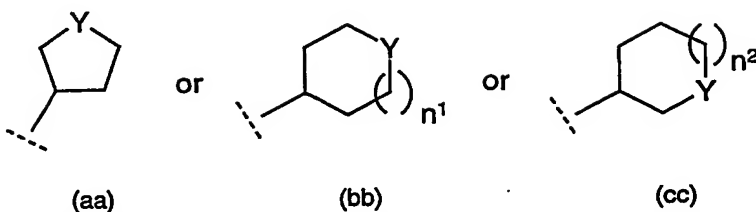


wherein:

25 R¹ is C₁₋₄alkyl, C₁₋₃fluoroalkyl, -CH₂CH₂OH or -CH₂CH₂CO₂C₁₋₂alkyl;

R² is a hydrogen atom (H), methyl or C₁fluoroalkyl;

30 R³ is optionally substituted C₃₋₈cycloalkyl or optionally substituted mono-unsaturated-C₅₋₇cycloalkenyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc);

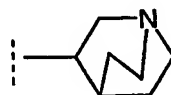


in which n^1 and n^2 independently are 1 or 2; and in which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is a hydrogen atom (H), C_{1-4} alkyl (e.g. methyl or ethyl), C_{1-2} fluoroalkyl, $\text{CH}_2\text{C}(\text{O})\text{NH}_2$, $\text{C}(\text{O})\text{NH}_2$, $\text{C}(\text{O})\text{-C}_{1-2}$ alkyl, $\text{C}(\text{O})\text{-C}_{1-2}$ fluoroalkyl or
 5 $\text{-C}(\text{O})\text{-CH}_2\text{O-C}_{1-2}$ alkyl;

and wherein in R^3 the C_{3-8} cycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents independently being (e.g. being) oxo ($=\text{O}$); OH; C_{1-2} alkoxy; C_{1-2} fluoroalkoxy (e.g. trifluoromethoxy); NHR^{21}

10 wherein R^{21} is a hydrogen atom (H) or C_{1-5} straight-chain alkyl (e.g. H or C_{1-4} straight-chain alkyl); C_{1-2} alkyl; C_{1-2} fluoroalkyl (e.g. C_1 fluoroalkyl such as $-\text{CH}_2\text{F}$ or $-\text{CHF}_2$); $-\text{CH}_2\text{OH}$; $-\text{CH}_2\text{CH}_2\text{OH}$; $-\text{CH}_2\text{NHR}^{22}$ wherein R^{22} is H or C_{1-2} alkyl; $-\text{C}(\text{O})\text{OR}^{23}$ wherein R^{23} is H or C_{1-2} alkyl; $-\text{C}(\text{O})\text{NHR}^{24}$ wherein R^{24} is H or C_{1-2} alkyl; $-\text{C}(\text{O})\text{R}^{25}$ wherein R^{25} is C_{1-2} alkyl; fluoro; hydroxyimino ($=\text{N-OH}$); or $(\text{C}_{1-4}\text{alkoxy})\text{imino}$
 15 $(=\text{N-OR}^{26})$ where R^{26} is C_{1-4} alkyl); and wherein any OH, alkoxy, fluoroalkoxy or NHR^{21} substituent is not substituted at the R^3 ring carbon attached (bonded) to the $-\text{NH}-$ group of formula (I) and is not substituted at either R^3 ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc);

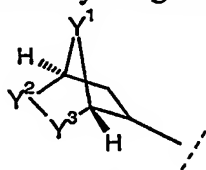
and wherein, when R^3 is optionally substituted mono-unsaturated- C_{5-7} cycloalkenyl, then
 20 the cycloalkenyl is optionally substituted with one or two substituents being fluoro or C_{1-2} alkyl provided that if there are two substituents then they are not both C_2 alkyl, and the R^3 ring carbon bonded to the $-\text{NH}-$ group of formula (I) does not partake in the cycloalkenyl double bond;



25 or R^3 is a bicyclic group of sub-formula (dd):

(dd)

or of sub-formula (ee):



(ee)

wherein Y^1 , Y^2 and Y^3 independently are CH_2 or oxygen (O) provided that no more than one of Y^1 , Y^2 and Y^3 is oxygen (O);

and X is NR^4R^5 or OR^{5a} , in which:

5 R^4 is a hydrogen atom (H); C_{1-6} alkyl; C_{1-3} fluoroalkyl; or C_{2-6} alkyl substituted by one substituent R^{11} ; and

10 R^5 is a hydrogen atom (H); C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl optionally substituted by a C_{1-2} alkyl group; or $-(\text{CH}_2)_n^4-\text{C}_{3-8}$ cycloalkyl optionally substituted, in the $-(\text{CH}_2)_n^4$ - moiety or in the C_{3-8} cycloalkyl moiety, by a C_{1-2} alkyl group, wherein n^4 is 1, 2 or 3;

or R^5 is C_{2-6} alkyl substituted by one or two independent substituents R^{11} ;

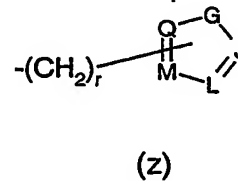
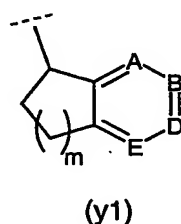
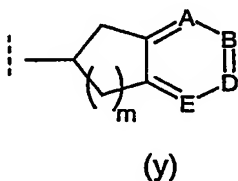
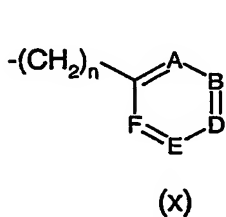
15 wherein each substituent R^{11} , independently of any other R^{11} substituent present, is: hydroxy (OH); C_{1-6} alkoxy; phenyloxy; benzyloxy; $-\text{NR}^{12}\text{R}^{13}$; $-\text{NR}^{15}-\text{C}(\text{O})\text{R}^{16}$; $-\text{NR}^{15}-\text{C}(\text{O})-\text{O}-\text{R}^{16}$; $-\text{NR}^{15}-\text{C}(\text{O})-\text{NH}-\text{R}^{15}$; or $-\text{NR}^{15}-\text{SO}_2\text{R}^{16}$; and wherein any R^{11} substituent which is OH, alkoxy or $-\text{NR}^{12}\text{R}^{13}$ is not substituted at any carbon atom, of any R^4 or R^5 substituted alkyl, which is bonded to the nitrogen of NR^4R^5 ;

20 or R^5 is $-(\text{CH}_2)_n^{11}-\text{C}(\text{O})\text{R}^{16}$; $-(\text{CH}_2)_n^{12}-\text{C}(\text{O})\text{NR}^{12}\text{R}^{13}$; $-\text{CHR}^{19}-\text{C}(\text{O})\text{NR}^{12}\text{R}^{13}$; $-(\text{CH}_2)_n^{12}-\text{C}(\text{O})\text{OR}^{16}$; $-(\text{CH}_2)_n^{12}-\text{C}(\text{O})\text{OH}$; $-\text{CHR}^{19}-\text{C}(\text{O})\text{OR}^{16}$; $-\text{CHR}^{19}-\text{C}(\text{O})\text{OH}$; $-(\text{CH}_2)_n^{12}-\text{SO}_2-\text{NR}^{12}\text{R}^{13}$; $-(\text{CH}_2)_n^{12}-\text{SO}_2\text{R}^{16}$; or $-(\text{CH}_2)_n^{12}-\text{CN}$; wherein n^{11} is 0, 1, 2, 3 or 4 and n^{12} is 1, 2, 3 or 4;

25 or R^5 is $-(\text{CH}_2)_n^{13}-\text{Het}$ wherein n^{13} is 0, 1, 2, 3 or 4 and Het is a 4-, 5-, 6- or 7-membered saturated or partly-saturated heterocyclic ring containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-hetero-atoms present are not bound to the $-(\text{CH}_2)_n^{13}$ - moiety when n^{13} is 1 and are not bound to the nitrogen of NR^4R^5 when n^{13} is 0; wherein any ring-nitrogens which are present and which are not unsaturated (i.e. which do not partake in a double bond) are present as NR^{17} where R^{17} is as defined herein; and wherein one or two of the carbon ring-atoms independently are optionally substituted by C_{1-2} alkyl;

30 or R^5 is phenyl optionally substituted with, independently, one, two or three of: a halogen atom; C_{1-6} alkyl (e.g. C_{1-4} alkyl or C_{1-2} alkyl); C_{1-2} fluoroalkyl (e.g. trifluoromethyl); C_{1-4} alkoxy (e.g. C_{1-2} alkoxy); C_{1-2} fluoroalkoxy (e.g. trifluoromethoxy); C_{3-6} cycloalkyloxy; $-\text{C}(\text{O})\text{R}^{16a}$; $-\text{C}(\text{O})\text{OR}^{30}$; $-\text{S}(\text{O})_2-\text{R}^{16a}$ (e.g. C_{1-2} alkylsulphonyl or

- $C_{1-2}alkyl-SO_2-$; $R^{16a}-S(O)_2-NR^{15a}$ (e.g. $C_{1-2}alkyl-SO_2-NH-$); $R^7R^8N-S(O)_2-$;
 $C_{1-2}alkyl-C(O)-R^{15a}N-S(O)_2-$; $C_{1-4}alkyl-S(O)-$, $Ph-S(O)-$, R^7R^8N-CO- ;
 $-NR^{15}-C(O)R^{16}$; R^7R^8N ; OH ; $C_{1-4}alkoxymethyl$; $C_{1-4}alkoxyethyl$;
 $C_{1-2}alkyl-S(O)_2-CH_2-$; $R^7R^8N-S(O)_2-CH_2-$; $C_{1-2}alkyl-S(O)_2-NR^{15a}-CH_2-$;
 5 $-CH_2-OH$; $-CH_2CH_2-OH$; $-CH_2-NR^7R^8$; $-CH_2-CH_2-NR^7R^8$; $-CH_2-C(O)OR^{30}$;
 $-CH_2-C(O)-NR^7R^8$; $-CH_2-NR^{15a}-C(O)-C_{1-3}alkyl$; $-(CH_2)_n^{14}-Het^1$ where n^{14} is 0 or 1;
 cyano (CN); Ar^{5a} ; or phenyl, pyridinyl or pyrimidinyl wherein the phenyl, pyridinyl or
 pyrimidinyl independently are optionally substituted by one or two of fluoro, chloro,
 $C_{1-2}alkyl$, $C_1fluoroalkyl$, $C_{1-2}alkoxy$ or $C_1fluoroalkoxy$; or where two adjacent
 10 substituents taken together are $-O-(CMe_2)-O-$ or $-O-(CH_2)_n^{14}-O-$ where n^{14} is 1 or 2;
 wherein R^7 and R^8 are independently a hydrogen atom (H); $C_{1-4}alkyl$ (e.g.
 $C_{1-2}alkyl$ such as methyl); $C_{3-6}cycloalkyl$; or phenyl optionally substituted by one or
 two of: fluoro, chloro, $C_{1-2}alkyl$, $C_1fluoroalkyl$, $C_{1-2}alkoxy$ or $C_1fluoroalkoxy$; or R^7
 and R^8 together are $-(CH_2)_n^6-$ or $-C(O)-(CH_2)_n^7-$ or $-C(O)-(CH_2)_n^7-C(O)-$ or
 15 $-(CH_2)_n^8-X^7-(CH_2)_n^9-$ or $-C(O)-X^7-(CH_2)_n^{10}-$ in which: n^6 is 3, 4, 5 or 6, n^7 is 2, 3,
 4, or 5 (preferably n^7 is 2, 3 or 4), n^8 and n^9 and n^{10} independently are 2 or 3 (preferably
 independently 2), and X^7 is O or NR^{14} wherein R^{14} is H, $C_{1-2}alkyl$ or $C(O)Me$
 (preferably H or $C_{1-2}alkyl$);
 20 or R^5 has the sub-formula (x), (y), (y1) or (z):



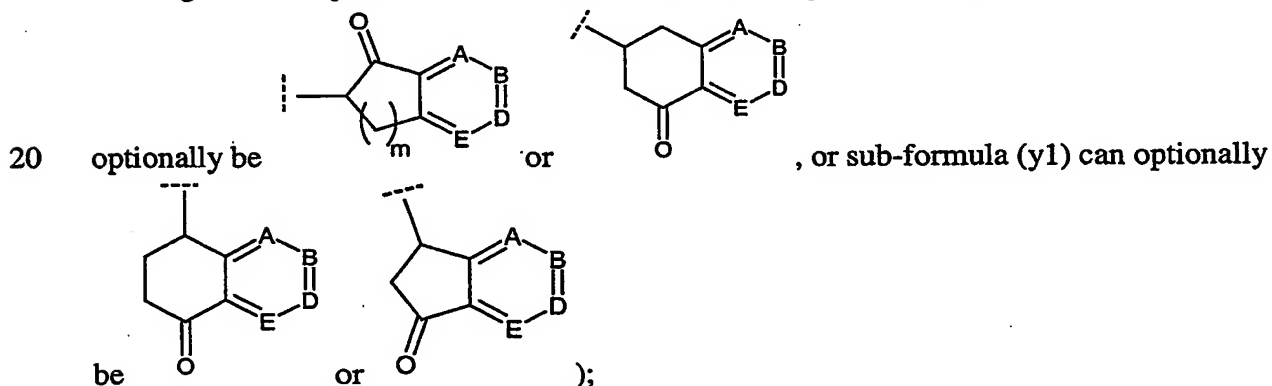
- 25 wherein in sub-formula (x), $n = 0, 1$ or 2 ; in sub-formula (y) and (y1), $m = 1$ or 2 ; and in
 sub-formula (z), $r = 0, 1$ or 2 ;

- wherein in sub-formula (x) and (y) and (y1), none, one or two of A, B, D, E and F are
 independently nitrogen or nitrogen-oxide (N^+-O^-) provided that no more than one of A,
 B, D, E and F is nitrogen-oxide; and the remaining of A, B, D, E and F are independently
 30 CH or CR^6 ;

provided that when n is 0 in sub-formula (x) then one or two of A, B, D, E and F are
 independently nitrogen or nitrogen-oxide (N^+-O^-) and no more than one of A, B, D, E
 and F is nitrogen-oxide;

- wherein, each R^6 , independently of any other R^6 present, is: a halogen atom; C_{1-6} alkyl (e.g. C_{1-4} alkyl or C_{1-2} alkyl); C_{1-4} fluoroalkyl (e.g. C_{1-2} fluoroalkyl); C_{1-4} alkoxy (e.g. C_{1-2} alkoxy); C_{1-2} fluoroalkoxy; C_{3-6} cycloalkyloxy; $-C(O)R^{16a}$; $-C(O)OR^{30}$;
 5 $-S(O)_2R^{16a}$ (e.g. C_{1-2} alkylsulphonyl, that is C_{1-2} alkyl- SO_2 -); $R^{16a}S(O)_2NR^{15a}$ (e.g. C_{1-2} alkyl- SO_2 -NH-); $R^7R^8N-S(O)_2$ -; C_{1-2} alkyl- $C(O)-R^{15a}N-S(O)_2$ -; C_{1-4} alkyl- $S(O)$ -, Ph- $S(O)$ -, R^7R^8N-CO -; $-NR^{15}-C(O)R^{16}$; R^7R^8N ; OH; C_{1-4} alkoxymethyl; C_{1-4} alkoxyethyl; C_{1-2} alkyl- $S(O)_2-CH_2$ -; $R^7R^8N-S(O)_2-CH_2$ -; C_{1-2} alkyl- $S(O)_2-NR^{15a}-CH_2$ -; $-CH_2-OH$; $-CH_2CH_2-OH$; $-CH_2-NR^7R^8$;
 10 $-CH_2-CH_2-NR^7R^8$; $-CH_2-C(O)OR^{30}$; $-CH_2-C(O)-NR^7R^8$; $-CH_2-NR^{15a}-C(O)-C_{1-3}$ alkyl; $-(CH_2)_{n^{14}}-Het^1$ where n^{14} is 0 or 1; cyano (CN); Ar^{5b} ; or phenyl, pyridinyl or pyrimidinyl wherein the phenyl, pyridinyl or pyrimidinyl independently are optionally substituted by one or two of fluoro, chloro, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy; or where two adjacent R^6 taken together
 15 are $-O-(CMe_2)-O-$ or $-O-(CH_2)_{n^{14}}-O-$ where n^{14} is 1 or 2;
 wherein R^7 and R^8 are as herein defined;

wherein sub-formula (y) and (y1), independently, are optionally substituted by oxo (=O) at a ring carbon adjacent the 6-membered aromatic ring (for example, sub-formula (y) can



- wherein in sub-formula (z), G is O or S or NR^9 wherein R^9 is a hydrogen atom (H), C_{1-4} alkyl or C_{1-4} fluoroalkyl; none, one, two or three of J, L, M and Q are nitrogen; and
 25 the remaining of J, L, M and Q are independently CH or CR^6 where R^6 , independently of any other R^6 present, is as defined herein;

- or R^4 and R^5 taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$ or
 30 $-(CH_2)_{p^3}-X^5-(CH_2)_{p^4}-$ or $-C(O)-X^5-(CH_2)_{p^5}-$, in which: $p^1 = 3, 4, 5$ or 6 (preferably p

= 4 or 5), p^2 is 2, 3, 4, or 5 (preferably p^2 is 2, 3 or 4), and p^3 and p^4 and p^5 independently are 2 or 3 (independently preferably 2) and X^5 is O or NR^{17} ;

and wherein, when R^4 and R^5 taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$, the NR^4R^5 heterocycle is optionally substituted by one R^{18} substituent wherein R^{18} is:
 5 C_{1-4} alkyl (e.g. C_{1-2} alkyl); C_{1-2} fluoroalkyl; C_{3-6} cycloalkyl; C_{1-2} alkoxy (not substituted at a ring-carbon bonded to the NR^4R^5 ring-nitrogen); C_1 fluoroalkoxy (not substituted at a ring-carbon bonded to the NR^4R^5 ring-nitrogen); OH (not substituted at a ring-carbon bonded to the NR^4R^5 ring-nitrogen); $-(CH_2)_{p^7}-C(O)R^{16}$ wherein p^7 is 0, 1, 2 or 3 (preferably p^7 is 0 or 1); $-(CH_2)_{p^7}-C(O)OR^{16}$; $-(CH_2)_{p^7}-OC(O)R^{16}$;
 10 $-(CH_2)_{p^7}-C(O)NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}C(O)R^{16}$; $-(CH_2)_{p^7}-NR^{15}C(O)NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}C(O)OR^{16}$; $-(CH_2)_{p^7}-SO_2R^{16}$; $-(CH_2)_{p^7}-SO_2NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}SO_2R^{16}$; $-(CH_2)_{p^7}-OH$; $-(CH_2)_{p^7}-OR^{16}$; or phenyl optionally substituted by one or two of: a halogen atom, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy;

15 or R^4 and R^5 taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$ or $-(CH_2)_{p^3}-X^5-(CH_2)_{p^4}-$ or $-C(O)-X^5-(CH_2)_{p^5}-$ as defined herein, and wherein the NR^4R^5 heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one or two of: a halogen atom, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy; and

20 R^{5a} is C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl; $-(CH_2)_n^{4a}-C_{3-6}$ cycloalkyl wherein n^{4a} is 1 or 2; phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula
 25 (x), (y) or (z) as defined herein

and wherein:

30 R^{12} and R^{13} independently are H; C_{1-5} alkyl (e.g. C_{1-3} alkyl); C_{3-6} cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy;

or R^{12} and R^{13} together are $-(CH_2)_n^6-$ or $-C(O)-(CH_2)_n^7-$ or $-C(O)-(CH_2)_n^7-C(O)-$ or $-(CH_2)_n^8-X^{12}-(CH_2)_n^9-$ or $-C(O)-X^{12}-(CH_2)_n^{10}-$ in which: n^6 is 3, 4, 5 or 6
 35 (preferably n^6 is 4 or 5), n^7 is 2, 3, 4, or 5 (preferably n^7 is 2, 3 or 4), n^8 and n^9 and n^{10} independently are 2 or 3 (independently preferably 2) and X^{12} is O or NR^{14a} wherein R^{14a} is H, C_{1-2} alkyl or $C(O)Me$ (preferably H or C_{1-2} alkyl);

R¹⁵ is a hydrogen atom (H); C₁₋₄alkyl (e.g. ^tBu or C₁₋₂alkyl e.g. methyl); C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

- 5 R^{15a}, independent of other R^{15a}, is a hydrogen atom (H) or C₁₋₄alkyl (e.g. H, ^tBu or C₁₋₂alkyl such as methyl; preferably R^{15a} is H or C₁₋₂alkyl, more preferably H);

R¹⁶ and R^{16a} independently are:

- 10 C₁₋₆alkyl (e.g. C₁₋₄alkyl or C₁₋₂alkyl);
 C₃₋₆cycloalkyl (e.g. C₅₋₆cycloalkyl) optionally substituted by one oxo (=O), OH or C₁₋₂alkyl substituent (e.g. optionally substituted at the 3- or 4-position of a C₅₋₆cycloalkyl ring; and/or preferably unsubstituted C₃₋₆cycloalkyl);
 C₃₋₆cycloalkyl-CH₂- (e.g. C₅₋₆cycloalkyl-CH₂-);
 15 pyridinyl (e.g. pyridin-2-yl) optionally substituted on a ring carbon atom by one of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;
 Ar^{5c};
 phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;
 20 benzyl optionally substituted at an aromatic carbon atom by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or
 a 4-, 5-, 6- or 7-membered saturated heterocyclic ring connected at a ring-carbon and containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-nitrogens which are present are present as NR²⁷ where R²⁷ is H, C₁₋₂alkyl or -C(O)Me; and wherein the ring is optionally substituted at carbon by one
 25 C₁₋₂alkyl or oxo (=O) substituent, provided that any oxo (=O) substituent is substituted at a ring-carbon atom bonded to a ring-nitrogen;

- 30 wherein Ar^{5a}, Ar^{5b} and Ar^{5c} independently is/are a 5-membered aromatic heterocyclic ring containing one O, S or NR^{15a} in the 5-membered ring, wherein the 5-membered ring can optionally additionally contain one or two N atoms, and wherein the heterocyclic ring is optionally substituted on a ring carbon atom by one of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, -CH₂OH, -CH₂-OC₁₋₂alkyl, OH (including the keto tautomer thereof) or -CH₂-NR²⁸R²⁹ wherein R²⁸ and R²⁹ independently are H or methyl;

- 35 and R¹⁷ is a hydrogen atom (H); C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; -(CH₂)_p⁶-C(O)R¹⁶ wherein p⁶ is 0, 1, 2 or 3 (preferably p⁶ is 0); -(CH₂)_p⁶-C(O)NR¹²R¹³; -(CH₂)_p⁶-C(O)OR¹⁶; -(CH₂)_p⁶-C(O)OH; -SO₂R¹⁶; -C(O)-CH₂-NR¹²R¹³; -C(O)-CH₂-NR^{15a}-C(O)-C₁₋₃alkyl; -C(O)-CH₂-O-C₁₋₃alkyl; or phenyl or benzyl wherein the phenyl or benzyl is optionally substituted at an aromatic

carbon atom by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

R¹⁹ is C₁₋₄alkyl; -(CH₂)_n²⁰-OR²⁰ wherein n²⁰ is 1, 2, 3 or 4 and R²⁰ is a hydrogen atom (H) or C₁₋₄alkyl; -CH(Me)-OH; -CH₂-SH; -CH₂-CH₂-S-Me; benzyl; or (4-hydroxyphenyl)methyl (i.e. 4-hydroxy-benzyl); and

R³⁰, independent of other R³⁰, is a hydrogen atom (H), C₁₋₄alkyl or C₃₋₆cycloalkyl; and

Het¹, independent of other Het¹, is a 4-, 5-, 6- or 7-membered saturated heterocyclic ring connected at a ring-carbon and containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-nitrogens which are present are present as NR³¹ where R³¹ is H, C₁₋₂alkyl or -C(O)Me; and wherein the ring is optionally substituted at carbon by one C₁₋₂alkyl or oxo (=O) substituent, provided that any oxo (=O) substituent is substituted at a ring-carbon atom bonded to a ring-nitrogen;

provided that:

when R³ is the heterocyclic group of sub-formula (bb), n¹ is 1, and Y is NR¹⁰, then: either (a) R¹⁰ is not C₁₋₄alkyl, C₁₋₂fluoroalkyl or CH₂C(O)NH₂;

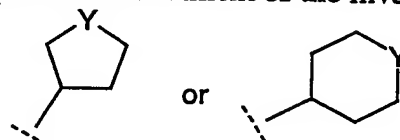
or (b) R¹⁰ is methyl and the compound is: ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate, 1-ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, 1-ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, or N-benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide.

Preferably, where X is OR^{5a}, the compound is other than the compound wherein R¹ is methyl, X is OEt, and R³ is cyclopentyl.

In one optional embodiment of the invention, R¹ is C₁₋₄alkyl or C₁₋₂fluoroalkyl.

Alternatively or additionally, in one optional embodiment of the invention, R² is a hydrogen atom (H).

Alternatively or additionally, in one optional embodiment of the invention, R^3 is

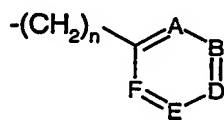


C_{3-8} cycloalkyl or a heterocyclic group being in which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is hydrogen, C_{1-4} alkyl, C_{1-2} fluoroalkyl, $C(O)-C_{1-2}$ alkyl, or $C(O)-CF_3$;

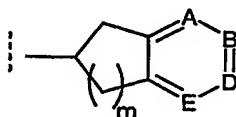
- 5 and wherein in R^3 the C_{3-8} cycloalkyl or heterocyclic group is optionally substituted with one or two substituents being OH, C_{1-2} alkoxy, trimethoxy, or C_{1-2} alkyl; and wherein any OH, alkoxy or trimethoxy substituent is not substituted at the (R^3) ring carbon attached (bonded) to the -NH- group of formula (I) and is not substituted at either (R^3) ring carbon bonded to the Y group of the heterocyclic group.

- 10 Alternatively or additionally, in one optional embodiment of the invention, R^4 is hydrogen, C_{1-2} alkyl or C_{1-2} fluoroalkyl.

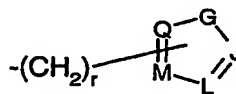
- Alternatively or additionally, in one optional embodiment of the invention, R^5 is hydrogen, C_{1-8} alkyl, C_{1-8} fluoroalkyl, or C_{3-8} cycloalkyl; or phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy or trifluoromethoxy; or R^5 has the sub-formula (x), (y) or (z):



(x)



(y)



(z)

- 20 wherein in sub-formula (x), $n = 1$ or 2 ; in sub-formula (y), $m = 1$ or 2 ; and in sub-formula (z), $r = 1$ or 2 ;

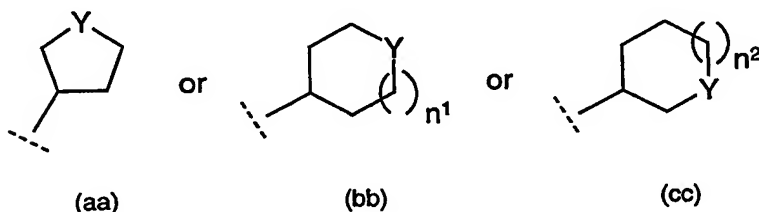
- wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are CH or CR^6 where R^6 is a halogen atom, C_{1-4} alkyl, C_{1-4} fluoroalkyl, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy, C_{1-2} alkylsulphonyl (C_{1-2} alkyl- SO_2 -), C_{1-2} alkyl- SO_2 -NH-, R^7R^8N - SO_2 -, R^7R^8N -CO-, R^7R^8N , OH, C_{1-4} alkoxymethyl, or C_{1-2} alkyl- SO_2 -CH₂-, wherein R^7 and R^8 are independently hydrogen or C_{1-2} alkyl;

wherein in sub-formula (z), G is O or S or NR^9 wherein R^9 is C_{1-4} alkyl or C_{1-4} fluoroalkyl; none, one or two of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are CH or CR^6 where R^6 is as defined herein.

- 30 In the alternative to the above R^4 and/or R^5 optional embodiments, in one optional embodiment of the invention, R^4 and R^5 taken together can be $-(CH_2)_{p^1}$ where $p^1 = 3, 4$ or 5 (preferably $p^1 = 4$ or 5).

In one optional embodiment of the invention, R^3 is optionally substituted C_{3-8} cycloalkyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb)

5 or (cc);



in which n^1 and n^2 independently are 1 or 2; and in which Y is O, S, SO_2 , or NR^{10} ;

10 where R^{10} is a hydrogen atom (H), C_{1-4} alkyl (e.g. methyl or ethyl), C_{1-2} fluoroalkyl, $CH_2C(O)NH_2$, $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl, or $C(O)-C_{1-2}$ fluoroalkyl;

and wherein in R^3 the C_{3-8} cycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents being oxo ($=O$), OH, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy (e.g. trifluoromethoxy), or C_{1-2} alkyl; and wherein any OH, alkoxy or fluoroalkoxy substituent is not substituted at the R^3 ring carbon attached (bonded) to the $-NH-$ group of formula (I) and is not substituted at either R^3 ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc).

Alternatively or additionally to the above optional R^3 definition, in one optional embodiment of the invention, X is NR^4R^5 or OR^{5a} , in which:

20

R^4 is a hydrogen atom (H); C_{1-6} alkyl; C_{1-3} fluoroalkyl; or C_{2-6} alkyl substituted by one substituent R^{11} ; and

25 R^5 is a hydrogen atom (H); C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl optionally substituted by a C_{1-2} alkyl group; or $-(CH_2)_{n^4}-C_{3-8}$ cycloalkyl optionally substituted, in the $-(CH_2)_{n^4}-$ moiety or in the C_{3-8} cycloalkyl moiety, by a C_{1-2} alkyl group, wherein n^4 is 1, 2 or 3;

or R^5 is C_{2-6} alkyl substituted by one or two independent substituents R^{11} ;

30

wherein each substituent R^{11} , independently of any other R^{11} substituent present, is: hydroxy (OH); C_{1-6} alkoxy; phenyloxy; benzyloxy; $-NR^{12}R^{13}$; $-NR^{15}-C(O)R^{16}$; $-NR^{15}-C(O)-O-R^{16}$; $-NR^{15}-C(O)-NH-R^{15}$; or $-NR^{15}-SO_2R^{16}$; and wherein any R^{11} substituent which is OH, alkoxy or $-NR^{12}R^{13}$ is not substituted at any carbon atom, of any R^4 or R^5 substituted alkyl, which is bonded to the nitrogen of NR^4R^5 ;

35

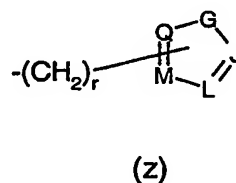
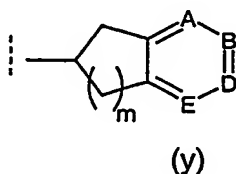
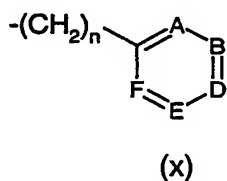
or R⁵ is $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{12}-C(O)NR^{12}R^{13}$; $-CHR^{19}-C(O)NR^{12}R^{13}$;
 $-(CH_2)_n^{12}-C(O)OR^{16}$; $-CHR^{19}-C(O)OR^{16}$; $-(CH_2)_n^{12}-SO_2-NR^{12}R^{13}$;
 $-(CH_2)_n^{12}-SO_2R^{16}$; or $-(CH_2)_n^{12}-CN$; wherein n¹¹ is 0, 1, 2, 3 or 4 and n¹² is 1, 2, 3
 5 or 4;

or R⁵ is $-(CH_2)_n^{13}-Het$ wherein n¹³ is 0, 1, 2, 3 or 4 and Het is a 4-, 5-, 6- or
 7-membered saturated or partly-saturated heterocyclic ring containing one or two
 ring-hetero-atoms independently selected from O, S, and N; wherein any
 10 ring-hetero-atoms present are not bound to the $-(CH_2)_n^{13}$ - moiety when n¹³ is 1 and are
 not bound to the nitrogen of NR⁴R⁵ when n¹³ is 0; wherein any ring-nitrogens which are
 present and which are not unsaturated (i.e. which do not partake in a double bond) are
 present as NR¹⁷ where R¹⁷ is as defined herein; and wherein one or two of the carbon
 ring-atoms independently are optionally substituted by C₁₋₂alkyl;

15 or R⁵ is phenyl optionally substituted with one or two of: a halogen atom; C₁₋₄alkyl (e.g.
 C₁₋₂alkyl); C₁₋₂fluoroalkyl (e.g. trifluoromethyl); C₁₋₄alkoxy (e.g. C₁₋₂alkoxy); C₁₋₂
 2fluoroalkoxy (e.g. trifluoromethoxy); C₁₋₂alkylsulphonyl (C₁₋₂alkyl-SO₂-);
 C₁₋₂alkyl-SO₂-NH-; R⁷R⁸N-SO₂-; R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶; R⁷R⁸N; OH;
 20 C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-SO₂-CH₂-; cyano (CN); or phenyl
 optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl,
 C₁₋₂alkoxy or C₁fluoroalkoxy;

wherein R⁷ and R⁸ are independently a hydrogen atom (H); C₁₋₄alkyl (e.g.
 C₁₋₂alkyl such as methyl); C₃₋₆cycloalkyl; or phenyl optionally substituted by one or
 25 two of: fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or R⁷
 and R⁸ together are $-(CH_2)_n^6-$ or $-C(O)-(CH_2)_n^7-$ or $-C(O)-(CH_2)_n^7-C(O)-$ or
 $-(CH_2)_n^8-X^7-(CH_2)_n^9-$ or $-C(O)-X^7-(CH_2)_n^{10}-$ in which: n⁶ is 3, 4, 5 or 6, n⁷ is 2, 3,
 4, or 5 (preferably n⁷ is 2, 3 or 4), n⁸ and n⁹ and n¹⁰ independently are 2 or 3, and X⁷ is
 O or NR¹⁴ wherein R¹⁴ is H or C₁₋₂alkyl;

30 or R⁵ has the sub-formula (x), (y) or (z):



wherein in sub-formula (x), $n = 1$ or 2 ; in sub-formula (y), $m = 1$ or 2 ; and in sub-formula (z), $r = 0, 1$ or 2 ;

- 5 wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are independently CH or CR⁶;

where R⁶ is a halogen atom; C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₁₋₄fluoroalkyl (e.g. C₁₋₂fluoroalkyl); C₁₋₄alkoxy (e.g. C₁₋₂alkoxy); C₁₋₂fluoroalkoxy; C₁₋₂alkylsulphonyl (C₁₋₂alkyl-SO₂-); C₁₋₂alkyl-SO₂-NH-; R⁷R⁸N-SO₂-; R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶;
 10 R⁷R⁸N; OH; C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-SO₂-CH₂-; cyano (CN); or phenyl optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; wherein R⁷ and R⁸ are as herein defined;

15 wherein in sub-formula (z), G is O or S or NR⁹ wherein R⁹ is a hydrogen atom (H), C₁₋₄alkyl or C₁₋₄fluoroalkyl; none, one, two or three of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are independently CH or CR⁶ where R⁶ is as defined herein;

or R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²- or -(CH₂)_p³-X⁵-(CH₂)_p⁴- or -C(O)-X⁵-(CH₂)_p⁵-, in which: p¹ = 3, 4, 5 or 6 (preferably p
 20 = 4 or 5), p² is 2, 3, 4, or 5 (preferably p² is 2, 3 or 4), and p³ and p⁴ and p⁵ independently are 2 or 3 (independently preferably 2) and X⁵ is O or NR¹⁷;

wherein R¹⁷ is a hydrogen atom (H); C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; -(CH₂)_p⁶-C(O)R¹⁶ wherein p⁶ is 0, 1, 2 or 3 (preferably p⁶ is 0); -(CH₂)_p⁶-C(O)NR¹²R¹³; -(CH₂)_p⁶-C(O)OR¹⁶; -SO₂R¹⁶; or phenyl or benzyl wherein
 25 the phenyl or benzyl is optionally substituted at an aromatic carbon atom by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

and wherein, when R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²-, the NR⁴R⁵ heterocycle is optionally substituted by one R¹⁸ substituent wherein R¹⁸ is: C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; C₁₋₂alkoxy (not substituted
 30 at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); C₁fluoroalkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); OH (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); -(CH₂)_p⁷-C(O)R¹⁶ wherein p⁷ is 0, 1, 2 or 3 (preferably p⁷ is 0 or 1); -(CH₂)_p⁷-C(O)OR¹⁶; -(CH₂)_p⁷-OC(O)R¹⁶;
 35 -(CH₂)_p⁷-C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)R¹⁶; -(CH₂)_p⁷-NR¹⁵C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)OR¹⁶; -(CH₂)_p⁷-SO₂R¹⁶; -(CH₂)_p⁷-SO₂NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵SO₂R¹⁶; -(CH₂)_p⁷-OH; -(CH₂)_p⁷-OR¹⁶; or phenyl optionally

substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

- or R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²- or
 5 -(CH₂)_p³-X⁵-(CH₂)_p⁴- or -C(O)-X⁵-(CH₂)_p⁵- as defined herein, and wherein the
 NR⁴R⁵ heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one
 or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

- R^{5a} is C₁₋₈alkyl; C₁₋₈ fluoroalkyl; C₃₋₈cycloalkyl; phenyl optionally substituted with
 10 one or two of: a halogen atom, C₁₋₂alkyl, trifluoromethyl, C₁₋₂alkoxy or
 trifluoromethoxy; or R^{5a} has the sub-formula (x), (y) or (z) as defined herein

and wherein:

- 15 R¹² and R¹³ independently are H; C₁₋₅alkyl (e.g. C₁₋₃alkyl); C₃₋₆cycloalkyl; or phenyl
 optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl,
 C₁₋₂alkoxy or C₁fluoroalkoxy;

- or R¹² and R¹³ together are -(CH₂)_n⁶- or -C(O)-(CH₂)_n⁷- or -C(O)-(CH₂)_n⁷-C(O)- or
 20 -(CH₂)_n⁸-X¹²-(CH₂)_n⁹- or -C(O)-X¹²-(CH₂)_n¹⁰- in which: n⁶ is 3, 4, 5 or 6
 (preferably n⁶ is 4 or 5), n⁷ is 2, 3, 4, or 5 (preferably n⁷ is 2, 3 or 4), n⁸ and n⁹ and n¹⁰
 independently are 2 or 3 (independently preferably 2) and X¹² is O or NR¹⁴ wherein
 R¹⁴ is H or C₁₋₂alkyl;

- 25 R¹⁵ is a hydrogen atom (H); C₁₋₄alkyl (e.g. ^tBu or C₁₋₂alkyl e.g. methyl);
 C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom,
 C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

- R¹⁶ is C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₃₋₆cycloalkyl; pyridinyl (e.g. pyridin-2-yl); or
 30 phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl,
 C₁₋₂alkoxy or C₁fluoroalkoxy; and

- R¹⁹ is C₁₋₄alkyl; -(CH₂)_n²⁰-OR²⁰ wherein n²⁰ is 1, 2, 3 or 4 and R²⁰ is a hydrogen
 atom (H) or C₁₋₄alkyl; -CH(Me)-OH; -CH₂-SH; -CH₂-CH₂-S-Me; benzyl; or
 35 (4-hydroxyphenyl)methyl (i.e. 4-hydroxy-benzyl).

In compounds, for example in the compounds of formula (I) (or formula (IA) or formula (IB), see later), an "alkyl" group or moiety may be straight-chain or branched. Alkyl groups, for example C₁₋₈alkyl or C₁₋₆alkyl or C₁₋₄alkyl or C₁₋₃alkyl or C₁₋₂alkyl, which may be employed include C₁₋₆alkyl or C₁₋₄alkyl or C₁₋₃alkyl or C₁₋₂alkyl such as methyl, ethyl, n-propyl, n-butyl, n-pentyl, or n-hexyl or any branched isomers thereof such as isopropyl, t-butyl, sec-butyl, isobutyl, 3-methylbutan-2-yl, 2-ethylbutan-1-yl, or the like.

A corresponding meaning is intended for "alkoxy", "alkylene", and like terms derived from alkyl. For example, "alkoxy" such as C₁₋₆alkoxy or C₁₋₄alkoxy or C₁₋₂alkoxy includes methoxy, ethoxy, propyloxy, and oxy derivatives of the alkyls listed above. "Alkylsulfonyl" such as C₁₋₄alkylsulfonyl includes methylsulfonyl (methanesulfonyl), ethylsulfonyl, and others derived from the alkyls listed above. "Alkylsulfonyloxy" such as C₁₋₄alkylsulfonyloxy includes methanesulfonyloxy (methylsulfonyloxy), ethanesulfonyloxy, *et al.*

"Cycloalkyl", for example C₃₋₈cycloalkyl, includes cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, cyclooctyl, and the like. Preferably, a C₃₋₈cycloalkyl group is C₃₋₆cycloalkyl or C₅₋₆cycloalkyl, that is contains a 3-6 membered or 5-6 membered carbocyclic ring.

"Fluoroalkyl" includes alkyl groups with one, two, three, four, five or more fluorine substituents, for example C₁₋₄fluoroalkyl or C₁₋₃fluoroalkyl or C₁₋₂fluoroalkyl such as monofluoromethyl, difluoromethyl, trifluoromethyl, pentafluoroethyl, 2,2,2-trifluoroethyl (CF₃CH₂-), 2,2-difluoroethyl (CHF₂CH₂-), 2-fluoroethyl (CH₂FCH₂-), etc. "Fluoroalkoxy" includes C₁₋₄fluoroalkoxy or C₁₋₂fluoroalkoxy such as trifluoromethoxy, pentafluoroethoxy, monofluoromethoxy, difluoromethoxy, etc. "Fluoroalkylsulfonyl" such as C₁₋₄fluoroalkylsulfonyl includes trifluoromethanesulfonyl, pentafluoroethylsulfonyl, etc.

A halogen atom ("halo") present in compounds, for example in the compounds of formula (I), can be a fluorine, chlorine, bromine or iodine atom ("fluoro", "chloro", "bromo" or "iodo").

When the specification states that atom or moiety A is "bonded" or "attached" to atom or moiety B, it means that atom/moiety A is directly bonded to atom/moiety B usually by means of one or more covalent bonds, and excludes A being indirectly attached to B via one or more intermediate atoms/moieties (e.g. excludes A-C-B); unless it is clear from the context that another meaning is intended.

Preferably, R¹ is C₁₋₄alkyl (e.g. methyl, ethyl, n-propyl, isopropyl or n-butyl), C₁₋₃fluoroalkyl or -CH₂CH₂OH; R¹ is more preferably C₁₋₃alkyl (e.g. methyl, ethyl or n-propyl), C₁₋₂fluoroalkyl, or -CH₂CH₂OH; still more preferably C₁₋₃alkyl, C₂fluoroalkyl or -CH₂CH₂OH such as methyl, ethyl, n-propyl or -CH₂CH₂OH. Yet more preferably, R¹ is C₂₋₃alkyl (e.g. ethyl or n-propyl), C₂fluoroalkyl (e.g.

C₁ fluoroalkyl-CH₂- such as CF₃-CH₂-) or -CH₂CH₂OH; in particular ethyl, n-propyl or -CH₂CH₂OH. R¹ is most preferably ethyl.

Preferably, R² is a hydrogen atom (H) or methyl, more preferably a hydrogen atom (H).

5

Preferably, in R³ there is one substituent or no substituent.

In one optional embodiment, R³ is the optionally substituted C₃-gcycloalkyl or the optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc). In this
10 embodiment, optionally, in R³, the C₃-gcycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents independently being (e.g. being) oxo (=O), OH, C₁-₂alkoxy, C₁-₂fluoroalkoxy (e.g. trifluoromethoxy), or C₁-₂alkyl; and wherein any OH, alkoxy or fluoroalkoxy substituent
15 is not substituted at the R³ ring carbon attached (bonded) to the -NH- group of formula (I) and is not substituted at either R³ ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc).

In one optional embodiment, where R³ is optionally substituted C₃-gcycloalkyl, it is not optionally substituted C₅cycloalkyl, i.e. not optionally substituted cyclopentyl. In this
20 case, more preferably, R³ is optionally substituted C₆-gcycloalkyl.

Where R³ is optionally substituted C₃-gcycloalkyl, it is more preferably optionally substituted C₆cycloalkyl (i.e. cyclohexyl); for example C₆cycloalkyl optionally
25 substituted with one or two substituents independently being (e.g. being) oxo (=O), OH, C₁-₂alkoxy, C₁-₂fluoroalkoxy (e.g. trifluoromethoxy), or C₁-₂alkyl, and wherein any OH, alkoxy or fluoroalkoxy substituent is not substituted at the R³ ring carbon attached (bonded) to the -NH- group of formula (I).

Where R³ is optionally substituted C₃-gcycloalkyl, the one or two optional substituents
30 preferably comprise (e.g. is or independently are (e.g. is or are)) oxo (=O); OH; C₁alkoxy; C₁fluoroalkoxy (e.g. trifluoromethoxy); NHR²¹ wherein R²¹ is a hydrogen atom (H) or C₁-₂ straight-chain alkyl; C₁-₂alkyl such as methyl; C₁fluoroalkyl such as -CH₂F or -CHF₂; -CH₂OH; -CH₂NHR²² wherein R²² is H; -C(O)OR²³ wherein R²³ is H or methyl; -C(O)NHR²⁴ wherein R²⁴ is H or methyl; -C(O)R²⁵ wherein R²⁵ is
35 methyl; fluoro; hydroxyimino (=N-OH); or (C₁-₂alkoxy)imino (=N-OR²⁶ where R²⁶ is C₁-₂alkyl); and wherein any OH, alkoxy, fluoroalkoxy or NHR²¹ substituent is not substituted at the R³ ring carbon attached (bonded) to the -NH- group of formula (I) and is not substituted at either R³ ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc).

More preferably, where R^3 is optionally substituted C_{3-8} cycloalkyl, the one or two optional substituents comprise (e.g. is or independently are (e.g. is or are)) oxo ($=O$); OH; NHR^{21} wherein R^{21} is a hydrogen atom (H); C_{1-2} alkyl such as methyl; C_1 fluoroalkyl such as $-CH_2F$ or $-CHF_2$; $-C(O)OR^{23}$ wherein R^{23} is H or methyl; $-C(O)NHR^{24}$ wherein R^{24} is H or methyl; fluoro; hydroxyimino ($=N-OH$); or $(C_{1-2}alkoxy)imino$ ($=N-OR^{26}$ where R^{26} is $C_{1-2}alkyl$).

Still more preferably, where R^3 is optionally substituted C_{3-8} cycloalkyl, the one or two optional substituents comprise (e.g. is or independently are (e.g. is or are)) oxo ($=O$); OH; NHR^{21} wherein R^{21} is a hydrogen atom (H); methyl; $-CH_2F$; $-CHF_2$; $-C(O)OR^{23}$ wherein R^{23} is H; fluoro; hydroxyimino ($=N-OH$); or $(C_{1-2}alkoxy)imino$ ($=N-OR^{26}$ where R^{26} is $C_{1-2}alkyl$). Yet more preferably, where R^3 is optionally substituted C_{3-8} cycloalkyl, the one or two optional substituents comprise (e.g. is or independently are (e.g. is or are)) oxo ($=O$); OH; methyl; fluoro; hydroxyimino ($=N-OH$); or $(C_{1-2}alkoxy)imino$ ($=N-OR^{26}$ where R^{26} is $C_{1-2}alkyl$).

Most preferably, where R^3 is optionally substituted C_{3-8} cycloalkyl, the one or two optional substituents comprise (e.g. is or independently are (e.g. is or are)) OH, oxo ($=O$) or oximo ($=N-OH$). For example, the one or two optional substituents can comprise (e.g. is or are) OH and/or oxo ($=O$).

Optionally, in R^3 , the C_{3-8} cycloalkyl can be unsubstituted.

Where R^3 is optionally substituted C_{3-8} cycloalkyl, e.g. optionally substituted C_5 -cycloalkyl such as optionally substituted C_6 cycloalkyl (optionally substituted cyclohexyl), the one or two optional substituents if present preferably comprise a substituent (for example is or are substituent(s)) at the 3-, 4- or 5- position(s) of the R^3 cycloalkyl ring. (In this connection, the 1-position of the R^3 cycloalkyl ring is deemed to be the connection point to the $-NH-$ in formula (I)).

Where R^3 is optionally substituted C_{3-8} cycloalkyl, any OH, alkoxy, fluoroalkoxy, $-CH_2OH$, $-CH_2CH_2OH$, $-CH_2NHR^{22}$, $-C(O)OR^{23}$, $-C(O)NHR^{24}$, $-C(O)R^{25}$ or fluoro substituent (particularly any OH substituent) is more preferably at the 3-, 4- or 5-position, e.g. 3- or 5-position, of the R^3 cycloalkyl (e.g. C_6 -cycloalkyl) ring. For example, any OH, alkoxy, fluoroalkoxy, $-CH_2OH$, $-CH_2CH_2OH$, $-CH_2NHR^{22}$, $-C(O)OR^{23}$, $-C(O)NHR^{24}$, $-C(O)R^{25}$ or fluoro substituent (particularly any OH substituent) can be at the 3-position of a R^3 C_5 cycloalkyl (cyclopentyl) ring or at the 3-,

4- or 5- position, e.g. 3- or 5-position, of a R^3 C₆cycloalkyl (cyclohexyl) ring. (In this connection, and also below, the 1-position of the R^3 cycloalkyl ring is deemed to be the connection point to the -NH- in formula (I)).

- 5 Where R^3 is optionally substituted C₃₋₈cycloalkyl, any NHR²¹ substituent is preferably at the 2-, 3-, 4- or 5- position, preferably the 2- or 3-position or more preferably the 3-position, of the R^3 cycloalkyl (e.g. C₆₋₈cycloalkyl e.g. cyclohexyl) ring.

- 10 Where R^3 is optionally substituted C₃₋₈cycloalkyl, any alkyl or fluoroalkyl substituent is preferably at the 1-, 2-, 3-, 4- or 5- position, more preferably the 1-, 2-, 3- or 5-position, still more preferably the 1- or 3-position, of the R^3 cycloalkyl (e.g. C₆₋₈cycloalkyl e.g. cyclohexyl) ring.

- 15 Where R^3 is optionally substituted C₃₋₈cycloalkyl, any oxo (=O), hydroxyimino (=N-OH); or (C₁₋₄alkoxy)imino (=N-OR²⁶) substituent is preferably at the 3- or 4-position, preferably at the 4-position, of the R^3 cycloalkyl (e.g. C₆₋₈cycloalkyl e.g. cyclohexyl) ring.

- 20 Where R^3 is optionally substituted C₃₋₈cycloalkyl, R^3 is preferably cyclohexyl (i.e. unsubstituted), or cyclohexyl substituted by one oxo (=O), OH, NHR²¹, C₁₋₂alkyl, C₁₋₂fluoroalkyl, -CH₂OH, -C(O)OR²³, -C(O)NHR²⁴, -C(O)R²⁵, fluoro, hydroxyimino (=N-OH), (C₁₋₄alkoxy)imino (=N-OR²⁶) substituent, or cyclohexyl substituted by two fluoro substituents. More preferably, R^3 is cyclohexyl (i.e. unsubstituted), or cyclohexyl substituted by one oxo (=O), OH, NHR²¹, C₁₋₂alkyl, C₁₋₂fluoroalkyl, -C(O)OR²³,
25 fluoro, hydroxyimino (=N-OH) or (C₁₋₄alkoxy)imino (=N-OR²⁶) substituent, or cyclohexyl substituted by two fluoro substituents. Still more preferably R^3 is cyclohexyl (i.e. unsubstituted) or cyclohexyl substituted by one oxo (=O), hydroxyimino (=N-OH), C₁₋₂alkyl or OH substituent. The optional substituent can be at the 3- or 4- position, e.g. 3-position, of the R^3 cyclohexyl ring; more preferably any OH substituent is preferably at
30 the 3-position of the R^3 cyclohexyl ring, and/or any oxo (=O), hydroxyimino (=N-OH) or (C₁₋₄alkoxy)imino (=N-OR²⁶) substituent is preferably at the 4-position of the R^3 cyclohexyl ring.

- 35 Where R^3 is optionally substituted C₆cycloalkyl, R^3 can for example be 4-hydroxy-cyclohexyl (i.e. 4-hydroxycyclohexan-1-yl), but R^3 is more preferably cyclohexyl (i.e. unsubstituted), 3-hydroxy-cyclohexyl (i.e. 3-hydroxycyclohexan-1-yl), 4-oxo-cyclohexyl (i.e. 4-oxocyclohexan-1-yl), 4-(hydroxyimino)cyclohexyl (i.e. 4-(hydroxyimino)cyclohexan-1-yl), 4-(C₁₋₂alkoxyimino)cyclohexyl, 1-methylcyclohexyl

or 3-methylcyclohexyl. Where R^3 is optionally substituted C_6 cycloalkyl, R^3 is most preferably cyclohexyl (i.e. unsubstituted), 4-oxo-cyclohexyl (i.e. 4-oxocyclohexan-1-yl) or 4-(hydroxyimino)cyclohexyl (i.e. 4-(hydroxyimino)cyclohexan-1-yl).

- 5 Where R^3 is optionally substituted C_5 cycloalkyl (optionally substituted cyclopentyl), R^3 can for example be cyclopentyl (i.e. unsubstituted) or 3-hydroxy-cyclopentyl.

- Where R^3 is optionally substituted mono-unsaturated- C_{5-7} cycloalkenyl, preferably it is optionally substituted mono-unsaturated- C_{5-6} cycloalkenyl, more preferably optionally substituted mono-unsaturated- C_6 cycloalkenyl (i.e. optionally substituted
10 mono-unsaturated-cyclohexenyl = optionally substituted cyclohexenyl). Still more preferably, the R^3 cyclohexenyl is optionally substituted cyclohex-3-en-1-yl.

- Where R^3 is optionally substituted mono-unsaturated- C_{5-7} cycloalkenyl, preferably the
15 R^3 cycloalkenyl is optionally substituted with one or two substituents being fluoro or methyl provided that if there are two substituents then they are not both methyl. Preferably, the R^3 cycloalkenyl is optionally substituted with one substituent being fluoro or C_{1-2} alkyl (e.g. methyl); more preferably the R^3 cycloalkenyl is substituted with one fluoro substituent or is unsubstituted. For R^3 cycloalkenyl, the optional substituent(s) can
20 be at the 1-, 2-, 3-, 4- or 5- position(s) of the cycloalkenyl ring.

- Where R^3 is the heterocyclic group of sub-formula (aa), (bb) or (cc), then Y is preferably O, S, SO_2 , NH or N-C(O)methyl, more preferably O, NH or N-C(O)methyl, still more preferably O or N-C(O)methyl, most preferably O. (When Y is NH or N-C(O)methyl,
25 then R^{10} is H or C(O)methyl).

- Preferably, R^{10} is a hydrogen atom (H), methyl, ethyl, C(O)NH₂, C(O)methyl or C(O)-CF₃. Optionally, R^{10} can be a hydrogen atom (H), methyl, ethyl, C(O)methyl or C(O)-CF₃, more preferably H, C(O)methyl or C(O)-CF₃, still more preferably H or
30 C(O)methyl.

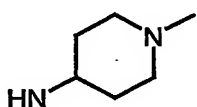
- Where R^3 is the heterocyclic group of sub-formula (aa), (bb) or (cc), then it is preferable that R^3 is the heterocyclic group of sub-formula (aa) or (bb), more preferably of sub-formula (bb).
35

In sub-formula (bb), n^1 is preferably 1. In sub-formula (cc), n^2 is preferably 1. That is, six-membered rings are preferred in the R^3 heterocyclic group.

- Suitably, in R^3 , the heterocyclic group of sub-formula (aa), (bb) or (cc) is unsubstituted
40 (In this connection, where Y is NR¹⁰, R^{10} is not classified as a substituent).

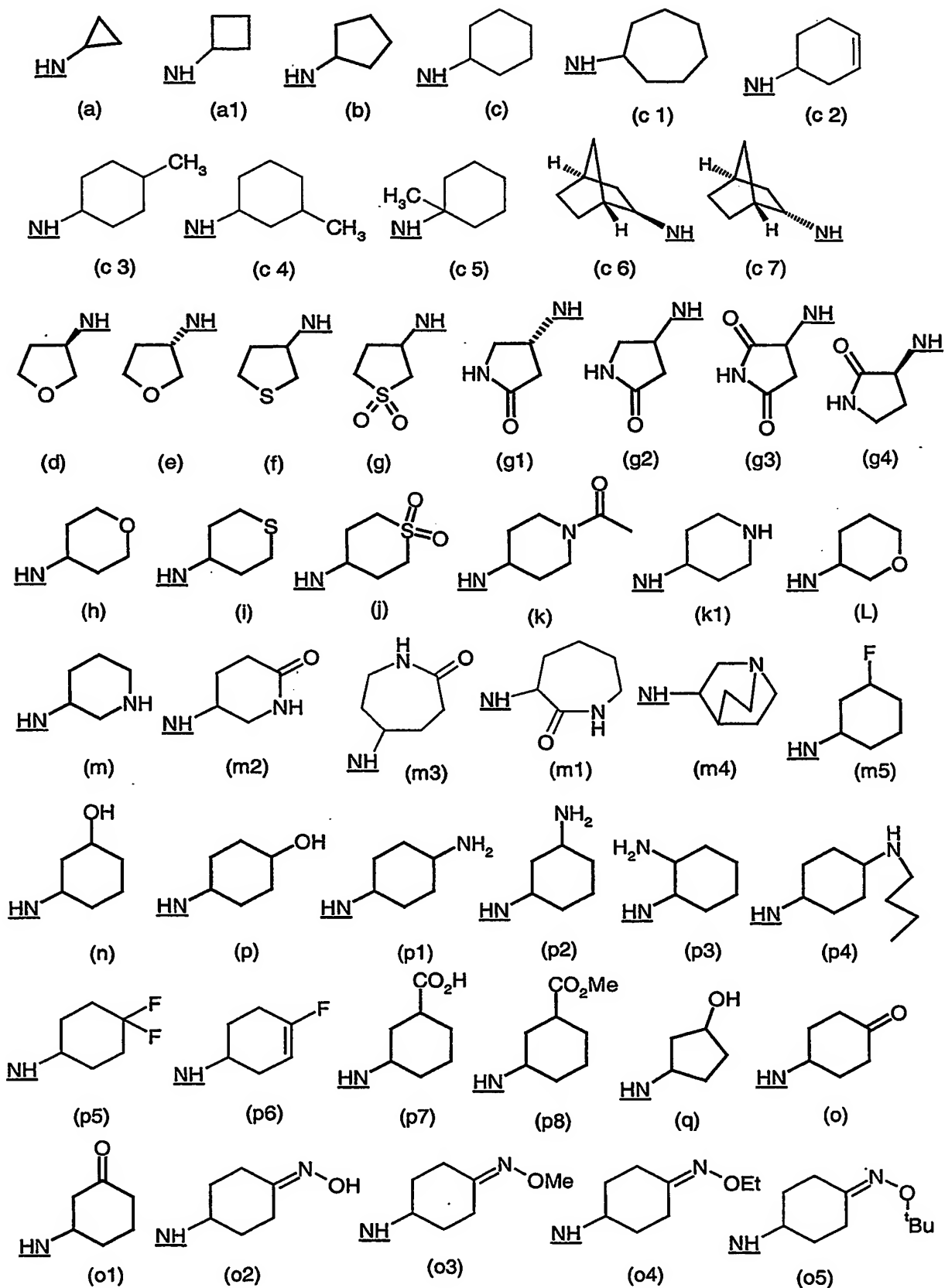
In the R^3 heterocyclic group of sub-formula (aa), (bb) or (cc), the one or two optional substituents preferably comprise (e.g. is or independently are ((e.g. is or are)) OH; oxo (=O); C_{1-2} alkyl (e.g. methyl) or C_{1-2} fluoroalkyl (e.g. C_1 fluoroalkyl such as $-CH_2F$ or $-CHF_2$). More preferably, in the R^3 heterocyclic group of sub-formula (aa), (bb) or (cc), the one or two optional substituents comprise (e.g. is or independently are ((e.g. is or are)) OH and/or oxo; most preferably the one or two optional substituents comprise (e.g. is or are) oxo (=O). In the R^3 heterocyclic group of sub-formula (aa), (bb) or (cc), any oxo (=O) substituents are preferably on a carbon atom bonded (adjacent) to X, and/or can be at the 2-, 3-, 4- or 5- position(s) of the R^3 heterocyclic ring. (In this connection, the 1-position of the R^3 heterocyclic ring is deemed to be the connection point to the $-NH-$ in formula (I)).

When R^3 is the heterocyclic group of sub-formula (aa) and Y is NR^{10} , then preferably R^{10} is not $C(O)-Me$. More preferably, when R^3 is the heterocyclic group of sub-formula (aa) and Y is NR^{10} , then R^{10} is preferably not $C(O)R$, i.e. or e.g. R^{10} is preferably not $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl or $C(O)-C_1$ fluoroalkyl. In one embodiment, Y is O, S, SO_2 or NH when R^3 is the heterocyclic group of sub-formula (aa).

Optionally, according to one embodiment of the invention, NHR^3 is not . More preferably, when R^3 is the heterocyclic group of sub-formula (bb) and Y is NR^{10} , and optionally when n^1 is 1, then preferably R^{10} is not methyl. More preferably, when R^3 is the heterocyclic group of sub-formula (bb) and Y is NR^{10} , and optionally when n^1 is 1, then R^{10} is preferably not alkyl or substituted alkyl, i.e. or e.g. R^{10} is preferably not C_{1-4} alkyl (e.g. methyl or ethyl), C_{1-2} fluoroalkyl or $CH_2C(O)NH_2$. In one embodiment, when R^3 is the heterocyclic group of sub-formula (bb), Y is preferably O, S, SO_2 or NR^{10} , wherein R^{10} is H, $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl or $C(O)-C_1$ fluoroalkyl, or more preferably Y is H or $C(O)Me$. More preferably, for sub-formula (bb), Y is O or NR^{10} .

Where R^3 is a bicyclic group of sub-formula (dd) or (ee), preferably it is of sub-formula (ee). In sub-formula (ee), preferably Y^1 , Y^2 and Y^3 are all CH_2 .

Preferably, NHR^3 is of sub-formula (a), (a1), (b), (c), (c 1), (c 2), (c 3), (c 4), (c 5), (c 6), (c 7), (d), (e), (f), (g), (g1), (g2), (g3), (g4), (h), (i), (j), (k), (k1), (L), (m), (m1), (m2), (m3), (m4), (m5), (n), (o), (o1), (o2), (o3), (o4), (o5), (p), (p1), (p2), (p3), (p4), (p5), (p6), (p7), (p8) or (q):



In the sub-formulae (a) to (q) etc above, the -NH- connection point of the NHR^3 group to the 4-position of the pyrazolopyridine of formula (I) is underlined.

5

Preferably, NHR^3 is of sub-formula (c), (c1), (c 2), (c 3), (c 4), (c 5), (c 6), (c 7), (d), (e), (f), (g1), (g4), (h), (i), (j), (k), (k1), (L), (m), (m1), (m2), (m3), (m5), (n), (o), (o1), (o2), (o3), (o4), (o5), (p), (p2), (p3), (p5), (p6), (p7) or (q). More preferably, NHR^3 is of sub-formula (c), (c1), (c 4), (c 5), (h), (i), (j), (k), (m1), (m2), (n), (o), (o2), (o3), (p2), (p5), (p6) or (q). Still more preferably, NHR^3 is of sub-formula (c), (h), (k), (n), (o) or (o2); for example (c), (h), (o) or (o2). Most preferably, R^3 is tetrahydro-2H-pyran-4-yl; that is NHR^3 is most preferably of sub-formula (h), as shown above.

10

According to one embodiment, NHR^3 is of sub-formula (a), (b), (c), (d), (e), (f), (g), (g1), (g2), (g3), (h), (i), (j), (k), (L), (m), (m1), (n), (o), (o1), (p) or (q). In this embodiment, preferably, NHR^3 is of sub-formula (c), (d), (e), (f), (g1), (h), (i), (j), (k), (m), (m1), (n), (o), (o1), (p), or (q); and more preferably in this embodiment, NHR^3 is of sub-formula (c), (h), (i), (j), (k), (m1), (n), (o) or (q). Still more preferably in this embodiment, NHR^3 is of sub-formula (c), (h), (k), (n) or (o). Most preferably, R^3 is tetrahydro-2H-pyran-4-yl; that is NHR^3 is most preferably of sub-formula (h), as shown above.

20

According to another embodiment, NHR^3 is of sub-formula (a), (b), (c), (d), (e), (f), (g), (h), (i), (j) or (k). In this embodiment, preferably, NHR^3 is of sub-formula (c), (d), (e), (f), (h), (i), (j) or (k); and more preferably in this embodiment, NHR^3 is of sub-formula (c), (h), (i), (j) or (k). Most preferably, R^3 is tetrahydro-2H-pyran-4-yl; that is NHR^3 is most preferably of sub-formula (h), as shown above.

25

Preferably, X is NR^4R^5 .

30

Where R^4 is C_{1-6} alkyl, then preferably it is C_{1-4} alkyl or C_{1-2} alkyl. Where R^4 is C_{1-3} fluoroalkyl then preferably it is C_{1-2} fluoroalkyl.

Most preferably, R^4 is a hydrogen atom (H).

35

Where R^4 is C_{2-6} alkyl substituted by one substituent R^{11} , then preferably R^4 is C_{2-4} alkyl (e.g. C_{2-3} alkyl) substituted by one substituent R^{11} . More preferably, R^4 is $-(\text{CH}_2)_n\text{R}^{11}$ wherein n^3 is 2, 3 or 4. Still more preferably, n^3 is 2 and/or R^4 is $-(\text{CH}_2)_n\text{OH}$.

40

When R^5 is C_{2-6} alkyl substituted by one or two independent substituents R^{11} , it is preferable that R^5 is C_{2-4} alkyl (e.g. C_{2-3} alkyl) substituted by one or two independent substituents R^{11} . When R^5 is C_{2-6} alkyl (e.g. C_{2-4} alkyl or C_{2-3} alkyl) substituted by one or two independent substituents R^{11} , it is preferable that R^5 is C_{2-6} alkyl (e.g. C_{2-4} alkyl or C_{2-3} alkyl) substituted by one substituent R^{11} . It is more preferable that R^5 is $-(CH_2)_n^5-R^{11}$ wherein n^5 is 2, 3 or 4. Preferably n^5 is 2 or 3, more preferably 2.

Preferably, each substituent R^{11} , independently of any other R^{11} substituent present, is: hydroxy (OH); C_{1-6} alkoxy (e.g. C_{1-4} alkoxy such as t-butyloxy, ethoxy or methoxy); phenyloxy; benzyloxy; $-NR^{12}R^{13}$; $-NR^{15}-C(O)R^{16}$; $-NR^{15}-C(O)-NH-R^{15}$; or $-NR^{15}-SO_2R^{16}$ (more preferably C_{1-6} alkoxy, $-NR^{15}-C(O)-NH-R^{15}$, or $-NR^{15}-SO_2R^{16}$; most preferably $-NR^{15}-SO_2R^{16}$). In all cases, any R^{11} substituent which is OH, alkoxy or $-NR^{12}R^{13}$ is not substituted at any carbon atom, of any R^4 or R^5 substituted alkyl, which is bonded to the nitrogen of NR^4R^5 .

Where R^5 is C_{1-8} alkyl, then preferably it is C_{1-5} alkyl or C_{1-3} alkyl. Where R^5 is C_{1-8} fluoroalkyl then preferably it is C_{1-3} fluoroalkyl or C_{1-2} fluoroalkyl. Where R^5 is C_{3-8} cycloalkyl optionally substituted by a C_{1-2} alkyl group, then preferably the C_{3-8} cycloalkyl is not substituted at the ring-carbon bonded to the nitrogen of NR^4R^5 . Where R^5 is optionally substituted C_{3-8} cycloalkyl, then more preferably it is C_{3-8} cycloalkyl (i.e. unsubstituted).

When R^5 is optionally substituted $-(CH_2)_n^4-C_{3-8}$ cycloalkyl wherein n^4 is 1, 2 or 3, then n^4 is preferably 1 or 2 or more preferably 1, and/or preferably R^5 is optionally substituted $-(CH_2)_n^4-C_{5-6}$ cycloalkyl or optionally substituted $-(CH_2)_n^4-C_6$ cycloalkyl. When R^5 is optionally substituted $-(CH_2)_n^4-C_{3-8}$ cycloalkyl, preferably it is not substituted. Most preferably R^5 is (cyclohexyl)methyl-, that is $-CH_2$ -cyclohexyl.

When R^{19} is C_{1-4} alkyl, then preferably it is isobutyl, sec-butyl, or C_{1-3} alkyl such as methyl or isopropyl. When R^{19} is $-(CH_2)_n^{20}-OR^{20}$, then preferably n^{20} is 1 and/or preferably R^{20} is a hydrogen atom (H).

When R^5 is $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{12}-C(O)NR^{12}R^{13}$; $-CHR^{19}-C(O)NR^{12}R^{13}$; $-(CH_2)_n^{12}-C(O)OR^{16}$; $-CHR^{19}-C(O)OR^{16}$; $-(CH_2)_n^{12}-SO_2-NR^{12}R^{13}$; $-(CH_2)_n^{12}-SO_2R^{16}$; or $-(CH_2)_n^{12}-CN$; then in one embodiment of the invention R^5 can

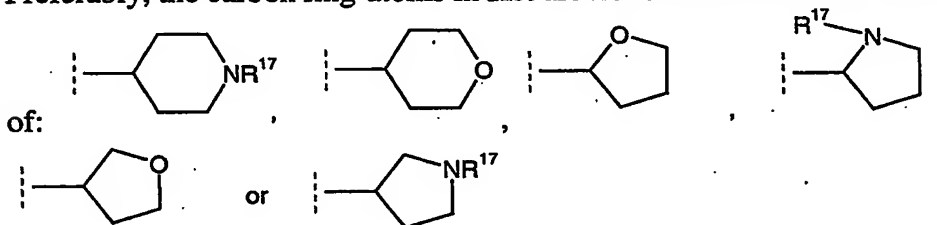
be: $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{12}-C(O)NR^{12}R^{13}$; $-(CH_2)_n^{12}-C(O)OR^{16}$;
 $-(CH_2)_n^{12}-SO_2-NR^{12}R^{13}$; $-(CH_2)_n^{12}-SO_2R^{16}$; or $-(CH_2)_n^{12}-CN$.

When R^5 is $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{12}-C(O)NR^{12}R^{13}$; $-(CH_2)_n^{12}-C(O)OR^{16}$;
 5 $-(CH_2)_n^{12}-SO_2-NR^{12}R^{13}$; $-(CH_2)_n^{12}-SO_2R^{16}$; or $-(CH_2)_n^{12}-CN$; then R^5 can for
 example be $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{12}-C(O)NR^{12}R^{13}$; or $-(CH_2)_n^{12}-CN$;
 preferably $-(CH_2)_n^{11}-C(O)R^{16}$.

10 Preferably, n^{11} is 1, 2, 3 or 4; more preferably n^{11} is 1 or 2. Advantageously, n^{12} is 1 or
 2.

When R^5 is $-(CH_2)_n^{13}-Het$, it is preferable that n^{13} is 0, 1 or 2, more preferably 0 or 1.

15 Preferably, Het is a 5- or 6-membered saturated or partly-saturated heterocyclic ring
 and/or preferably is a 4-, 5-, 6- or 7-membered saturated heterocyclic ring. Preferably,
 the heterocyclic ring Het contains one ring-hetero-atom selected from O, S and N.
 Preferably, the carbon ring-atoms in Het are not substituted. Het is most preferably one



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When R^5 is optionally substituted phenyl, then preferably it is phenyl optionally
 substituted with one or two of the substituents defined herein.

25 When R^5 is optionally substituted phenyl, then preferably R^5 is phenyl optionally
 substituted with, independently, one, two or three (preferably one or two; or one) of: a
 halogen atom (preferably fluoro and/or chloro); C_{1-2} alkyl; C_{1-2} fluoroalkyl (e.g.
 trifluoromethyl); C_{1-2} alkoxy (e.g. methoxy); trifluoromethoxy; C_{1-2} alkylsulphonyl
 (C_{1-2} alkyl- SO_2 -); C_{1-2} alkyl- SO_2 -NH-; R^7R^8N - SO_2 -; R^7R^8N -CO-; $-NR^{15}-C(O)R^{16}$;
 R^7R^8N ; OH; C_{1-2} alkoxymethyl; C_{1-2} alkyl- SO_2 -CH₂-; cyano (CN); or phenyl
 30 optionally substituted by one of fluoro, C_{1-2} alkyl, C_{1-2} fluoroalkyl, C_{1-2} alkoxy or
 C_{1-2} fluoroalkoxy. More preferably R^5 is phenyl optionally substituted with one or two
 (preferably one) of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy,
 trifluoromethoxy, R^7R^8N - SO_2 -, R^7R^8N -CO-, or C_{1-2} alkyl- SO_2 -CH₂-. When R^5 is
 optionally substituted phenyl, then preferably one or all of the one or two optional

substituents are substituted at the *meta*- (3- and/or 5-) and/or *para*- (4-) position(s) of the phenyl ring with respect to the phenyl ring-carbon bonded to the nitrogen of NR⁴R⁵.

- 5 Preferably, R⁷ and/or R⁸ are independently a hydrogen atom (H); C₁₋₂alkyl such as methyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one of: fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or R⁷ and R⁸ together are -(CH₂)_n⁶- or -(CH₂)_n⁸-X⁷-(CH₂)_n⁹- wherein X⁷ is NR¹⁴ or preferably O.

- 10 When R⁷ is cycloalkyl or optionally substituted phenyl, then preferably R⁸ is neither cycloalkyl nor optionally substituted phenyl.

Most preferably, R⁷ and/or R⁸ independently are a hydrogen atom (H) or C₁₋₂alkyl. It is preferable that R⁷ is a hydrogen atom (H).

- 15 Preferably n⁶ is 4 or 5. Preferably n⁷ is 2, 3 or 4. Preferably, n⁸, n⁹ and/or n¹⁰ is/are independently 2.

In general, it is preferable that R⁵ has the sub-formula (x) or (y) or (y1) or (z).

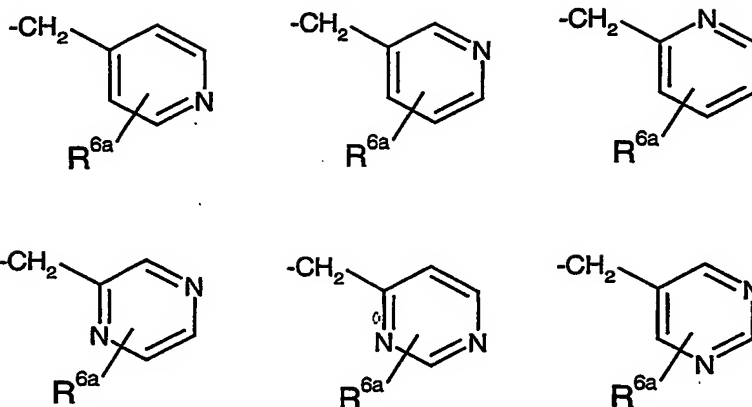
- 20 When R⁵ has the sub-formula (x) or (y) or (y1) or (z), then preferably R⁵ has the sub-formula (x) or (y) or (y1) or has the sub-formula (x) or (y) or (z). More preferably R⁵ has the sub-formula (x) or (y), most preferably (x).

- 25 Preferably, n is 1 or 2. More preferably, n = 1. Preferably, m = 1. Preferably, r = 1 or 2, more preferably 1.

- 30 In sub-formula (x), (y) and/or (y1), it is preferred that none, one or two of A, B, D, E and F are nitrogen; none, one, two or three of A, B, D, E and F are CR⁶; and the remaining of A, B, D, E and F are CH. More preferably, none, one or two of A, B, D, E and F are nitrogen; none, one or two of A, B, D, E and F are CR⁶; and the remaining of A, B, D, E and F are CH.

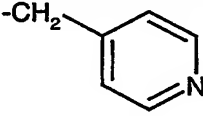
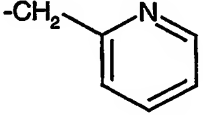
- 35 In sub-formula (x), (y) and/or (y1), preferably, none or one of A, B, D, E and F are nitrogen, and/or preferably none, one or two of A, B, D, E and F are CR⁶.

Preferably, sub-formula (x) is: benzyl; phenethyl (Ph-C₂H₄-); benzyl substituted on the phenyl ring with one or two R⁶ substituents; phenethyl (Ph-C₂H₄-) substituted on the phenyl ring with one or two R⁶ substituents; or one of the following:

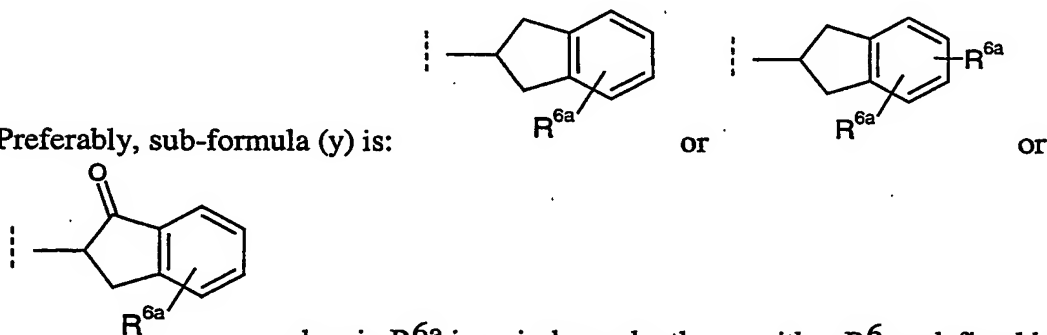


, wherein R^{6a} is either R^6 as defined herein or (preferably) hydrogen.

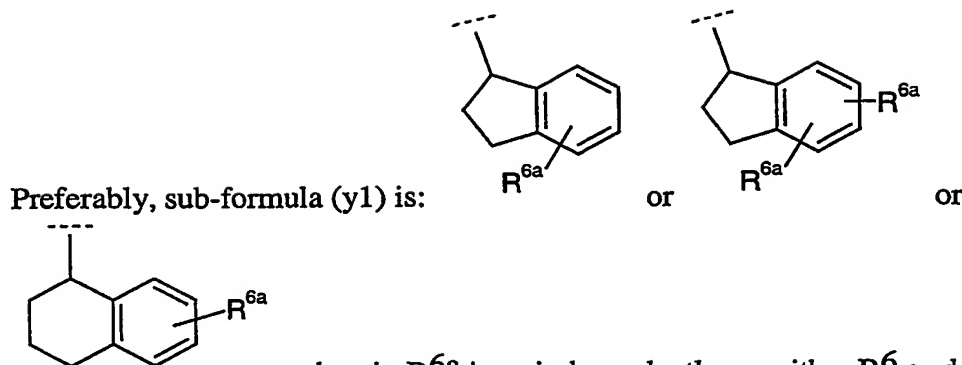
Most preferably, sub-formula (x) is benzyl or pyridinylmethyl

- 5 [e.g. pyridin-4-ylmethyl (i.e. , pyridin-3-ylmethyl, or preferably pyridin-2-ylmethyl (i.e. )].

Preferably, sub-formula (y) is:



- 10 , wherein R^{6a} is or independently are either R^6 as defined herein or preferably hydrogen. Preferably, sub-formula (y) is not substituted by oxo ($=\text{O}$) at the carbon between the 6-membered aromatic ring and the carbon bonded to the nitrogen of NR^4R^5 .



, wherein R^{6a} is or independently are either R^6 as defined herein or preferably hydrogen.

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Preferably, in sub-formula (z), none, one or two of J, L, M and Q are nitrogen.

In sub-formula (x), (y) and/or (z), preferably, each R^6 , independently of any other R^6 present, is a fluorine, chlorine, bromine or iodine atom, methyl, ethyl, n-propyl, isopropyl, C_4 alkyl, trifluoromethyl, $-CH_2OH$, methoxy, ethoxy, C_1 fluoroalkoxy (e.g. trifluoromethoxy or difluoromethoxy), OH, C_{1-3} alkylS(O) $_2$ - (such as methylsulphonyl which is $MeS(O)_2$ -), C_{1-3} alkylS(O) $_2$ -NH- such as methyl-SO $_2$ -NH-, $Me_2N-S(O)_2$ -, $H_2N-S(O)_2$ -, $-CONH_2$, $-CONHMe$, $-CO_2H$, cyano (CN), NMe_2 , t-butoxymethyl, or C_{1-3} alkylS(O) $_2$ -CH $_2$ - such as methyl-SO $_2$ -CH $_2$ -. More preferably, each R^6 , independently of any other R^6 present, is a fluorine, chlorine, bromine or iodine atom, methyl, ethyl, n-propyl, isopropyl, isobutyl, trifluoromethyl, $-CH_2OH$, methoxy, ethoxy, C_1 fluoroalkoxy (e.g. trifluoromethoxy or difluoromethoxy), C_{1-3} alkylS(O) $_2$ - such as methylsulphonyl, C_{1-3} alkylS(O) $_2$ -NH- such as methyl-SO $_2$ -NH-, $Me_2N-S(O)_2$ -, $H_2N-S(O)_2$ -, $-CONH_2$, or C_{1-3} alkylS(O) $_2$ -CH $_2$ - such as methyl-SO $_2$ -CH $_2$ -. Still more preferably, each R^6 , independently of any other R^6 present, is a fluorine, chlorine or bromine atom, methyl, ethyl, n-propyl, isopropyl, trifluoromethyl, $-CH_2OH$, methoxy, difluoromethoxy, methylsulphonyl, methyl-SO $_2$ -NH- or methyl-SO $_2$ -CH $_2$ -.

The above preferred R^6 substituents are also, independently, the preferred phenyl optional and independent substituents for where R^5 is optionally substituted phenyl.

In sub-formula (x) and/or (y), preferably, one, two or three R^6 substituents are present in B, D and/or E; so that for example in sub-formula (x), one, two or three R^6 substituents are present in the meta- (3- and/or 5-) and/or para- (4-) positions with respect to the $-(CH_2)_n$ - side-chain.

In sub-formula (x) and/or (y), any optional R^6 substituent can optionally be present only in B, D and/or E, so that in sub-formula (x) any optional R^6 substituent is present only in

the meta- (3- and/or 5-) and/or para- (4-) positions with respect to the $-(CH_2)_n-$ side-chain. Alternatively, in sub-formula (x), any optional R^6 substituent can be present in the ortho- (2- and/or 6-) position with respect to the $-(CH_2)_n-$ side-chain, either alone or in combination with one or more other optional R^6 substituents.

5

Overall for R^5 , it is preferable that R^5 is a hydrogen atom (H); C_{1-6} alkyl (e.g. $C_{1,2\text{or}3}$ alkyl or C_{3-6} alkyl); C_{1-4} fluoroalkyl, C_{3-6} cycloalkyl (e.g. C_{5-6} cycloalkyl), (C_{5-6} cycloalkyl)methyl-, phenyl optionally substituted with one or two of: a fluorine or chlorine atom, methyl, trifluoromethyl, methoxy or trifluoromethoxy; or R^5 has the sub-

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Still more preferably, R^5 is a hydrogen atom (H), methyl, ethyl, n-propyl, iso-propyl, 2-ethylbutan-1-yl, cyclopentyl, cyclohexyl, (cyclohexyl)methyl-, optionally substituted phenyl e.g. fluorophenyl e.g. 4-fluorophenyl, optionally substituted benzyl, or optionally

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substituted pyridinylmethyl. Optionally, R^5 can be benzyl, pyridinylmethyl (e.g. pyridin-4-ylmethyl, pyridin-3-ylmethyl, or preferably pyridin-2-ylmethyl), or 4-fluorophenyl.

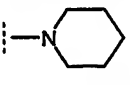
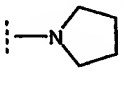
Preferably NR^4R^5 is not NH_2 . R^5 is preferably not a hydrogen atom (H).

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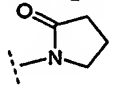
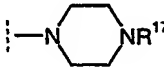
When R^4 and R^5 taken together are optionally substituted $-(CH_2)_p^1-$ or optionally substituted $-C(O)-(CH_2)_p^2-$ or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$ or $-C(O)-X^5-(CH_2)_p^5-$ or a partially unsaturated derivative of any of the foregoing, preferably R^4 and R^5 taken together are optionally substituted $-(CH_2)_p^1-$ or optionally substituted $-C(O)-(CH_2)_p^2-$ or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$ or $-C(O)-X^5-(CH_2)_p^5-$ (i.e. not a partially unsaturated

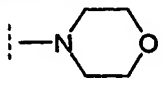
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derivative of any of these).
When R^4 and R^5 taken together are $-(CH_2)_p^1-$ optionally substituted by R^{18} , or $-C(O)-(CH_2)_p^2-$ optionally substituted by R^{18} , or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$, NR^4R^5 can

for example be  optionally substituted by R^{18} , or  optionally

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substituted by R^{18} , or  optionally substituted by R^{18} , or  (i.e. R^4

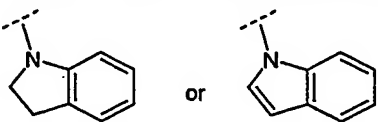
and R^5 taken together are $-(CH_2)_2-N(R^{17})-(CH_2)_2-$, or  (i.e. R^4 and R^5 taken together are $-(CH_2)_2-O-(CH_2)_2-$).

Preferably, R¹⁷ is a hydrogen atom (H); C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₃₋₆cycloalkyl; -(CH₂)_p⁶-C(O)R¹⁶, or the optionally substituted phenyl or benzyl. More preferably, R¹⁷ is H; C₁₋₂alkyl; -(CH₂)_p⁶-C(O)R¹⁶ or the optionally substituted phenyl.

- 5 When R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²-, the NR⁴R⁵ heterocycle is preferably not substituted by R¹⁸.

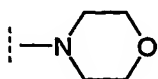
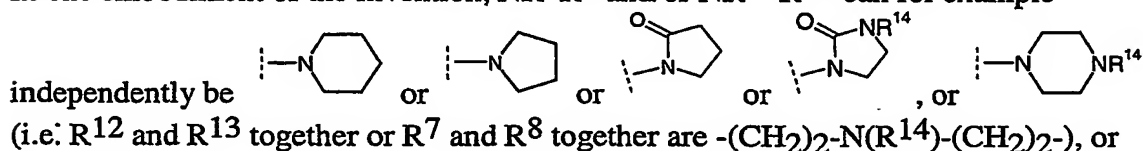
When R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²-, and if the NR⁴R⁵ heterocycle is substituted by R¹⁸, then optionally R¹⁸ is not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen.

When R⁴ and R⁵ taken together are $-(CH_2)_p^1-$ or $-C(O)-(CH_2)_p^2-$ or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$ or $-C(O)-X^5-(CH_2)_p^5-$ or a partially unsaturated derivative of any of these, and wherein the NR⁴R⁵ heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; then in one embodiment of the invention NR⁴R⁵ is



wherein the phenyl is optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy.

- 20 In one embodiment of the invention, NR⁷R⁸ and/or NR¹²R¹³ can for example



(i.e. R¹² and R¹³ together or R⁷ and R⁸ together are -(CH₂)₂-O-(CH₂)₂-, or NMe₂).

25

Preferably, R¹⁵ is a hydrogen atom (H) or C₁₋₄alkyl (e.g. ^tBu or C₁₋₂alkyl e.g. methyl); more preferably, R¹⁵ is a hydrogen atom (H).

- 30 Preferably, however, R⁴ and R⁵ are not taken together, i.e. are not taken together to form the NR⁴R⁵ ring systems described herein.

(Similar preferences apply for R^{5a} as for R⁵, except that R^{5a} cannot be a hydrogen atom. Most preferably, R^{5a} is ethyl.)

In an especially preferable embodiment, NR⁴R⁵ is the NR⁴R⁵ group as defined in any one of: Examples 21-98, 100-182, 187-188, 191-200, 201-203, 210-353, 355-651, 653-658 and 660-664.

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It is particularly preferred that the compound of formula (I) or the salt thereof is:

- Ethyl 4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 10 Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1-acetylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 15 Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 20 Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 N-Benzyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 25 1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclopentyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 4-(Cyclohexylamino)-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 30 N-Cyclopentyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 4-[(1-Acetylpiperidin-4-yl)amino]-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclopentyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-amine,
 35 N-Cyclohexyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-amine,
 1-Ethyl-5-(pyrrolidin-1-ylcarbonyl)-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,
 4-(Cyclopentylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 40 4-(Cyclohexylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

- 1-Ethyl-N-(pyridin-4-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
5 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
10 4-(Cyclohexylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-ethylbutyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
15 4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
20 4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
25 1-Ethyl-N-n-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
30 4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
35 4-(Cyclopentylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Ethylbutyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
40 4-(Cyclopentylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

- N-(4-Fluorophenyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
5 1-Methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
10 4-[(1-Acetylpiperidin-4-yl)amino]-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N,N-dimethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
15 1-Ethyl-N-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-isopropyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
20 N-Benzyl-1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
25 N-Benzyl-4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
30 1-Ethyl-N-(4-fluorophenyl)-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
35 1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopropylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
40 4-[(1,1-Dioxidotetrahydrothien-3-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, or

4-[(1,1-Dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide;

or a salt thereof, e.g. a pharmaceutically acceptable salt thereof.

5

The structures of these specific compounds are given in Examples 1-98 hereinafter.

10

Alternatively, it is particularly preferred that the compound of formula (I) or the salt thereof is:

- 1-Ethyl-N-[4-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
tert-Butyl (1-{[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl}piperidin-3-yl)methylcarbamate,
1-Ethyl-N-[3-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-5-{[5-methoxy-6-(trifluoromethyl)-2,3-dihydro-1H-indol-1-yl]carbonyl}-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-*b*]pyridin-4-amine,
N-[(5-Chloropyridin-2-yl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(4-Chlorobenzyl)-1-ethyl-N-isopropyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3-Chlorobenzyl)-1-ethyl-N-(2-hydroxyethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-N-[(5-methyl-3-phenylisoxazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(2-*tert*-Butoxyethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-N-(pyrimidin-4-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-N-[(2-methyl-1,3-thiazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[3-(*tert*-Butoxymethyl)benzyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-N-{2-[methyl(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-N-(pyrazin-2-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-5-{[4-(pyridin-2-ylcarbonyl)piperazin-1-yl]carbonyl}-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-*b*]pyridin-4-amine,

- N*-(2-Chloro-6-fluorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-[(6-oxo-1,6-dihydropyridin-3-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 5 *N*-[3-(Aminocarbonyl)benzyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-{4-[(methylamino)carbonyl]phenyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-[2-(1-methyl-1*H*-imidazol-4-yl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 10 *N*-{2-[(Anilino)carbonyl]amino}ethyl}-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-(1*H*-tetraazol-5-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 15 1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[2-(1*H*-1,2,4-triazol-1-yl)ethyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
tert-Butyl 2-[[[1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl](methyl)amino]ethylcarbamate,
 1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[4-(trifluoromethyl)phenyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 20 *tert*-Butyl 4-([1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl)amino)piperidine-1-carboxylate,
 1-Ethyl-*N*-{3-[(methylsulfonyl)amino]propyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 25 *N*-[2-(Dimethylamino)benzyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-[(1-ethylpyrrolidin-2-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-Ethyl-*N*-(tetrahydrofuran-2-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 30 1-ethyl-*N*-tetrahydro-2*H*-pyran-4-yl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-{4-[(Dimethylamino)sulfonyl]benzyl}-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 35 1-Ethyl-*N*-{3-[(methylsulfonyl)amino]benzyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
 1-[[1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl]piperidine-2-carboxamide,
 1-Ethyl-*N*-(4-methoxyphenyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 40 1-Ethyl-*N*-[3-(2-oxopyrrolidin-1-yl)propyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

- 1-Ethyl-*N*-[2-(1-methylpyrrolidin-2-yl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(pyridin-3-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 5 1-Ethyl-*N*-(1-methylpiperidin-4-yl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(1-ethylpropyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(2-piperidin-1-ylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 10 1-Ethyl-*N*-(3-morpholin-4-ylpropyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3-Ethoxypropyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 15 *N*-(Cyclohexylmethyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[3-(Dimethylamino)propyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-neopentyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-
- 20 carboxamide,
1-ethyl-*N*-(4-methoxybenzyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{2-[(phenylsulfonyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 25 *N*-[2-(Acetylamino)ethyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{2-[(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-methyl-*N*-(pyridin-4-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 30 1-Ethyl-*N*-{2-[(2-methoxyphenyl)(methyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(2-oxo-2-phenylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 35 *N*-(2,5-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[4-(trifluoromethyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N,1-Diethyl-*N*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-
- 40 carboxamide,
N-Cyclopropyl-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

- N-(2-amino-2-oxoethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(3-methoxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
5 N-(3,4-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Ethyl 3-([1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl)amino)propanoate,
N-(1-Benzylpiperidin-4-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
10 N-Butyl-4-([1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl)piperazine-1-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-(1,3,4-thiadiazol-2-yl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
15 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-(2-oxoimidazolidin-1-yl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3,4-Dimethoxybenzyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
20 N-(3-Chlorobenzyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-5-[(4-methylpiperazin-1-yl)carbonyl]-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,
25 1-Ethyl-N-(2-hydroxyethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-5-{[4-(4-methoxyphenyl)piperazin-1-yl]carbonyl}-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,
1-Ethyl-N-{4-[(methylsulfonyl)methyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
30 N-[3-(dimethylamino)-3-oxopropyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(1-methyl-1H-imidazol-5-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
35 1-Ethyl-N-{4-[(methylamino)sulfonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Cyanoethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-methyl-N-[(5-methyl-1,3,4-oxadiazol-2-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
40 1-Ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

- 1-Ethyl-*N*-methyl-*N*-[(1-methyl-1*H*-imidazol-2-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-(2-thien-2-ylethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 5 *N*-[2-(4-Chlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[2-(2-methoxyphenyl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Ethyl 4-(cyclohexylamino)-1-(3-ethoxy-3-oxopropyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-
- 10 carboxylate,
Ethyl 1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 1-(2-hydroxyethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
- 15 *N*-[4-(Methylsulfonyl)benzyl]-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(4-Fluorophenyl)-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Ethyl 1-ethyl-6-methyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-
- 20 5-carboxylate,
Ethyl 4-(cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
4-(Cyclohexylamino)-1-ethyl-6-methyl-*N*-[4-(methylsulfonyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-4-(cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-
- 25 carboxamide,
4-(Cyclohexylamino)-1-ethyl-*N*-(4-fluorophenyl)-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-6-methyl-*N*-[4-(trifluoromethyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 30 4-(Cyclohexylamino)-*N*-(2,3-dihydro-1*H*-inden-2-yl)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-6-methyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(2-oxoazepan-3-yl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-
- 35 carboxamide,
N-Benzyl-1-ethyl-4-[(3-hydroxycyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
- 40 *N*-Benzyl-1-ethyl-4-[(3-hydroxycyclopentyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide, or
N-Benzyl-1-ethyl-4-[(4-oxocyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide;

or a salt thereof, e.g. a pharmaceutically acceptable salt thereof.

The structures of these specific compounds are given in Examples 100-201 hereinafter.

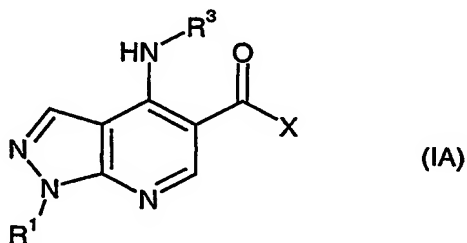
Alternatively, the compound of formula (I) or the salt thereof can be:

1-Ethyl-*N*-(2-hydroxy-1-methylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide, or
Methyl (2*S*)-2-([1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl)amino)-3-hydroxypropanoate;

or a salt thereof, e.g. a pharmaceutically acceptable salt thereof. (See for example Examples 202-203).

Alternatively, it is particularly preferred that the compound of formula (I) or the salt thereof is selected from Examples 204 to 664, as a compound or a salt thereof, e.g. a pharmaceutically acceptable salt thereof. The structures of these specific compounds are given in Examples 204 to 664 hereinafter.

A second aspect of the present invention provides a compound of formula (IA) or a salt thereof (in particular, a pharmaceutically acceptable salt thereof):

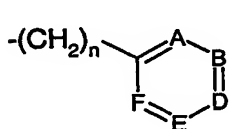


wherein:

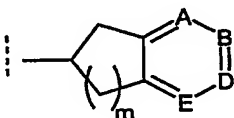
X is NR^4R^5 or OR^{5a} , in which:

R^4 is hydrogen, C_{1-2} alkyl or C_{1-2} fluoroalkyl, and

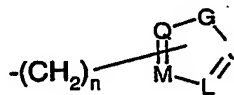
R^5 is hydrogen, C_{1-8} alkyl, C_{1-8} fluoroalkyl, or C_{3-8} cycloalkyl, phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy or trifluoromethoxy; or R^5 has the sub-formula (x), (y) or (z):



(x)



(y)



(z)

5

wherein in sub-formula (x) and (z), $n = 1$ or 2 ; and in sub-formula (y), $m = 1$ or 2 ;

wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are CH or CR^6 where R^6 is a halogen atom, C_{1-4} alkyl, C_{1-4} fluoroalkyl, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy, C_{1-2} alkylsulphonyl (C_{1-2} alkyl- SO_2 -), C_{1-2} alkyl- SO_2 -NH-, R^7R^8N - SO_2 -, R^7R^8N -CO-, R^7R^8N , OH, C_{1-4} alkoxymethyl, or C_{1-2} alkyl- SO_2 - CH_2 -, wherein R^7 and R^8 are independently hydrogen or C_{1-2} alkyl;

10

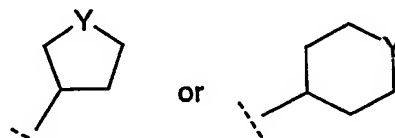
wherein in sub-formula (z), G is O or S or NR^9 wherein R^9 is C_{1-4} alkyl or C_{1-4} fluoroalkyl; none, one or two of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are CH or CR^6 where R^6 is as defined herein;

15

or R^4 and R^5 taken together are $-(CH_2)_p-$ where $p = 3, 4$ or 5 (preferably $p = 4$);

20

R^{5a} is C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl; phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula (x), (y) or (z) as defined herein;



or

R^3 is C_{3-8} cycloalkyl or a heterocyclic group being

in

25

which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is hydrogen, C_{1-4} alkyl, C_{1-2} fluoroalkyl, $C(O)$ - C_{1-2} alkyl, or $C(O)$ - CF_3 ;

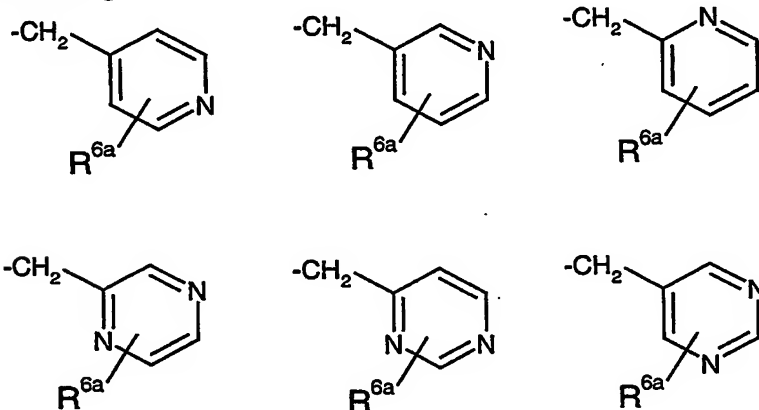
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and wherein in R^3 the C_{3-8} cycloalkyl or heterocyclic group is optionally substituted with one or two substituents being OH, C_{1-2} alkoxy, trimethoxy, or C_{1-2} alkyl group; and wherein any OH, alkoxy or trimethoxy substituent is not substituted at the ring carbon attached to the -NH- group of formula (IA) and is not substituted at either ring carbon bonded to the Y group of the heterocyclic group; and

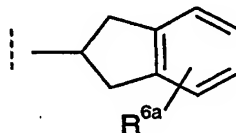
$R^1 = C_{1-4}$ alkyl or C_{1-2} fluoroalkyl.

5 In formula (IA), in sub-formula (x) and/or (y), it is preferred that none, one or two of A, B, D, E and F are nitrogen; none, one, two or three of A, B, D, E and F are CR^6 ; and the remaining of A, B, D, E and F are CH. More preferably, none, one or two of A, B, D, E and F are nitrogen; none or one or two of A, B, D, E and F are CR^6 ; and the remaining of A, B, D, E and F are CH. In formula (IA), in sub-formula (x) and/or (y), preferably, none or one of A, B, D, E and F are nitrogen.

10 In formula (IA), preferably, sub-formula (x) is: benzyl; phenethyl ($Ph-C_2H_4-$); benzyl or phenethyl being substituted on the phenyl ring with a single R^6 substituent, or one of the following:



15 , wherein R^{6a} is either R^6 as defined herein or (preferably) hydrogen.

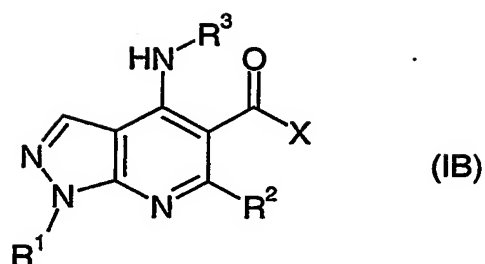


In formula (IA), preferably, sub-formula (y) is:
either R^6 as defined herein or preferably hydrogen.

, wherein R^{6a} is

20 Examples 1-99 are examples of compounds or salts of the second aspect of the invention (Formula (IA)).

25 A third aspect of the present invention provides a compound of formula (IB) or a salt thereof (in particular, a pharmaceutically acceptable salt thereof):

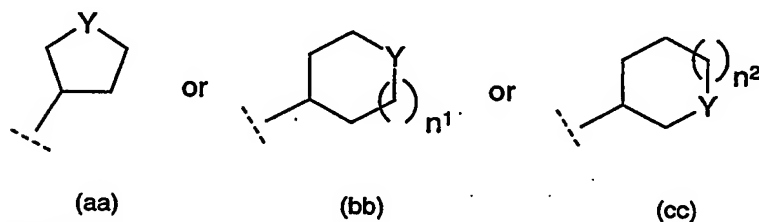


wherein:

R^1 is C_{1-4} alkyl, C_{1-3} fluoroalkyl, $-CH_2CH_2OH$ or $-CH_2CH_2CO_2C_{1-2}$ alkyl;

R^2 is a hydrogen atom (H), methyl or C_1 fluoroalkyl;

R^3 is optionally substituted C_{3-8} cycloalkyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc);



in which n^1 and n^2 independently are 1 or 2; and in which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is a hydrogen atom (H), C_{1-4} alkyl (e.g. methyl or ethyl), C_{1-2} fluoroalkyl, $CH_2C(O)NH_2$, $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl, or $C(O)-C_1$ fluoroalkyl;

and wherein in R^3 the C_{3-8} cycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents being oxo ($=O$), OH, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy (e.g. trifluoromethoxy), or C_{1-2} alkyl; and wherein any OH, alkoxy or fluoroalkoxy substituent is not substituted at the R^3 ring carbon attached (bonded) to the $-NH-$ group of formula (IB) and is not substituted at either R^3 ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc);

and X is NR^4R^5 or OR^{5a} , in which:

R^4 is a hydrogen atom (H); C_{1-6} alkyl; C_{1-3} fluoroalkyl; or C_{2-6} alkyl substituted by one substituent R^{11} ; and

R^5 is a hydrogen atom (H); C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl optionally substituted by a C_{1-2} alkyl group; or $-(CH_2)_n-C_{3-8}$ cycloalkyl optionally substituted, in

the $-(CH_2)_n^{4-}$ moiety or in the C_{3-8} cycloalkyl moiety, by a C_{1-2} alkyl group, wherein n^4 is 1, 2 or 3;

or R^5 is C_{2-6} alkyl substituted by one or two independent substituents R^{11} ;

5

wherein each substituent R^{11} , independently of any other R^{11} substituent present, is: hydroxy (OH); C_{1-6} alkoxy; phenyloxy; benzyloxy; $-NR^{12}R^{13}$; $-NR^{15}-C(O)R^{16}$; $-NR^{15}-C(O)-O-R^{16}$; $-NR^{15}-C(O)-NH-R^{15}$; or $-NR^{15}-SO_2R^{16}$; and wherein any R^{11} substituent which is OH, alkoxy or $-NR^{12}R^{13}$ is not substituted at any carbon atom, of
10 any R^4 or R^5 substituted alkyl, which is bonded to the nitrogen of NR^4R^5 ;

or R^5 is $-(CH_2)_n^{11}-C(O)R^{16}$; $-(CH_2)_n^{11}-C(O)NR^{12}R^{13}$; $-CHR^{19}-C(O)NR^{12}R^{13}$; $-(CH_2)_n^{12}-C(O)OR^{16}$; $-CHR^{19}-C(O)OR^{16}$; $-(CH_2)_n^{12}-SO_2-NR^{12}R^{13}$; $-(CH_2)_n^{12}-SO_2R^{16}$; or $-(CH_2)_n^{12}-CN$; wherein n^{11} is 0, 1, 2, 3 or 4 and n^{12} is 1, 2, 3
15 or 4;

or R^5 is $-(CH_2)_n^{13}-Het$ wherein n^{13} is 0, 1, 2, 3 or 4 and Het is a 4-, 5-, 6- or
20 7-membered saturated or partly-saturated heterocyclic ring containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-hetero-atoms present are not bound to the $-(CH_2)_n^{13}$ - moiety when n^{13} is 1 and are not bound to the nitrogen of NR^4R^5 when n^{13} is 0; wherein any ring-nitrogens which are present and which are not unsaturated (i.e. which do not partake in a double bond) are present as NR^{17} where R^{17} is as defined herein; and wherein one or two of the carbon ring-atoms independently are optionally substituted by C_{1-2} alkyl;

25

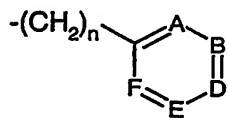
or R^5 is phenyl optionally substituted with one or two of: a halogen atom; C_{1-4} alkyl (e.g. C_{1-2} alkyl); C_{1-2} fluoroalkyl (e.g. trifluoromethyl); C_{1-4} alkoxy (e.g. C_{1-2} alkoxy); C_{1-2} fluoroalkoxy (e.g. trifluoromethoxy); C_{1-2} alkylsulphonyl (C_{1-2} alkyl- SO_2 -); C_{1-2} alkyl- SO_2 -NH-; $R^7R^8N-SO_2$ -; R^7R^8N-CO -; $-NR^{15}-C(O)R^{16}$; R^7R^8N ; OH;
30 C_{1-4} alkoxymethyl; C_{1-4} alkoxyethyl; C_{1-2} alkyl- SO_2-CH_2 -; cyano (CN); or phenyl optionally substituted by one or two of fluoro, chloro, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy;

wherein R^7 and R^8 are independently a hydrogen atom (H); C_{1-4} alkyl (e.g. C_{1-2} alkyl such as methyl); C_{3-6} cycloalkyl; or phenyl optionally substituted by one or
35 two of: fluoro, chloro, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy; or R^7 and R^8 together are $-(CH_2)_n^6$ - or $-C(O)-(CH_2)_n^7$ - or $-C(O)-(CH_2)_n^7-C(O)-$ or $-(CH_2)_n^8-X^7-(CH_2)_n^9$ - or $-C(O)-X^7-(CH_2)_n^{10}$ - in which: n^6 is 3, 4, 5 or 6, n^7 is 2, 3,

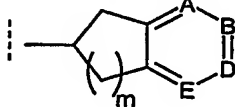
4, or 5 (preferably n^7 is 2, 3 or 4), n^8 and n^9 and n^{10} independently are 2 or 3, and X^7 is O or NR^{14} wherein R^{14} is H or C_{1-2} alkyl;

or R^5 has the sub-formula (x), (y) or (z):

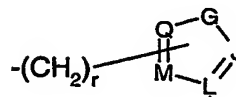
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(x)



(y)



(z)

wherein in sub-formula (x), $n = 1$ or 2 ; in sub-formula (y), $m = 1$ or 2 ; and in sub-formula (z), $r = 0, 1$ or 2 ;

10

wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are independently CH or CR^6 ;

where R^6 is a halogen atom; C_{1-4} alkyl (e.g. C_{1-2} alkyl); C_{1-4} fluoroalkyl (e.g. C_{1-2} fluoroalkyl); C_{1-4} alkoxy (e.g. C_{1-2} alkoxy); C_{1-2} fluoroalkoxy; C_{1-2} alkylsulphonyl (C_{1-2} alkyl- SO_2 -); C_{1-2} alkyl- SO_2 -NH-; R^7R^8N - SO_2 -; R^7R^8N -CO-; - NR^{15} -C(O) R^{16} ; R^7R^8N ; OH; C_{1-4} alkoxymethyl; C_{1-4} alkoxyethyl; C_{1-2} alkyl- SO_2 -CH₂-; cyano (CN); or phenyl optionally substituted by one or two of fluoro, chloro, C_{1-2} alkyl, C_{1-2} fluoroalkyl, C_{1-2} alkoxy or C_{1-2} fluoroalkoxy; wherein R^7 and R^8 are as herein defined;

20

wherein in sub-formula (z), G is O or S or NR^9 wherein R^9 is a hydrogen atom (H), C_{1-4} alkyl or C_{1-4} fluoroalkyl; none, one, two or three of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are independently CH or CR^6 where R^6 is as defined herein;

or R^4 and R^5 taken together are $-(CH_2)_p^1-$ or $-C(O)-(CH_2)_p^2-$ or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$ or $-C(O)-X^5-(CH_2)_p^5-$, in which: $p^1 = 3, 4, 5$ or 6 (preferably $p^1 = 4$ or 5), p^2 is $2, 3, 4$, or 5 (preferably p^2 is $2, 3$ or 4), and p^3 and p^4 and p^5 independently are 2 or 3 (independently preferably 2) and X^5 is O or NR^{17} ;

wherein R^{17} is a hydrogen atom (H); C_{1-4} alkyl (e.g. C_{1-2} alkyl); C_{1-2} fluoroalkyl;

C_{3-6} cycloalkyl; $-(CH_2)_p^6-C(O)R^{16}$ wherein p^6 is $0, 1, 2$ or 3 (preferably p^6 is 0); $-(CH_2)_p^6-C(O)NR^{12}R^{13}$; $-(CH_2)_p^6-C(O)OR^{16}$; $-SO_2R^{16}$; or phenyl or benzyl wherein the phenyl or benzyl is optionally substituted at an aromatic carbon atom by one or two of: a halogen atom, C_{1-2} alkyl, C_{1-2} fluoroalkyl, C_{1-2} alkoxy or C_{1-2} fluoroalkoxy;

and wherein, when R^4 and R^5 taken together are $-(CH_2)_p^1-$ or $-C(O)-(CH_2)_p^2-$,

the NR^4R^5 heterocycle is optionally substituted by one R^{18} substituent wherein R^{18} is:

C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; C₁₋₂alkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); C₁fluoroalkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); OH (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); -(CH₂)_p⁷-C(O)R¹⁶ wherein p⁷ is 0, 1, 2 or 3 (preferably p⁷ is 0 or 1); -(CH₂)_p⁷-C(O)OR¹⁶; -(CH₂)_p⁷-OC(O)R¹⁶; -(CH₂)_p⁷-C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)R¹⁶; -(CH₂)_p⁷-NR¹⁵C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)OR¹⁶; -(CH₂)_p⁷-SO₂R¹⁶; -(CH₂)_p⁷-SO₂NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵SO₂R¹⁶; -(CH₂)_p⁷-OH; -(CH₂)_p⁷-OR¹⁶; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²- or -(CH₂)_p³-X⁵-(CH₂)_p⁴- or -C(O)-X⁵-(CH₂)_p⁵- as defined herein, and wherein the NR⁴R⁵ heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

R^{5a} is C₁₋₈alkyl; C₁₋₈ fluoroalkyl; C₃₋₈cycloalkyl; phenyl optionally substituted with one or two of: a halogen atom, C₁₋₂alkyl, trifluoromethyl, C₁₋₂alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula (x), (y) or (z) as defined herein

and wherein:

R¹² and R¹³ independently are H; C₁₋₅alkyl (e.g. C₁₋₃alkyl); C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R¹² and R¹³ together are -(CH₂)_n⁶- or -C(O)-(CH₂)_n⁷- or -C(O)-(CH₂)_n⁷-C(O)- or -(CH₂)_n⁸-X¹²-(CH₂)_n⁹- or -C(O)-X¹²-(CH₂)_n¹⁰- in which: n⁶ is 3, 4, 5 or 6 (preferably n⁶ is 4 or 5), n⁷ is 2, 3, 4, or 5 (preferably n⁷ is 2, 3 or 4), n⁸ and n⁹ and n¹⁰ independently are 2 or 3 (independently preferably 2) and X¹² is O or NR¹⁴ wherein R¹⁴ is H or C₁₋₂alkyl;

R¹⁵ is a hydrogen atom (H); C₁₋₄alkyl (e.g. ^tBu or C₁₋₂alkyl e.g. methyl); C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

R¹⁶ is C₁₋₄alkyl (e.g. C₁₋₂alkyl); C₃₋₆cycloalkyl; pyridinyl (e.g. pyridin-2-yl); or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

- 5 R¹⁹ is a hydrogen atom (H); C₁₋₄alkyl (e.g. isobutyl, sec-butyl, or C₁₋₃alkyl such as methyl or isopropyl); -(CH₂)_n²⁰-OR²⁰ wherein n²⁰ is 1, 2, 3 or 4 (preferably 1) and R²⁰ is a hydrogen atom (H) or C₁₋₄alkyl (preferably R²⁰ is H); -CH(Me)-OH; -CH₂-SH; -CH₂-CH₂-S-Me; benzyl; or (4-hydroxyphenyl)methyl (i.e. 4-hydroxy-benzyl).
- 10 In formula (IB), where R³ is optionally substituted C₃₋₈cycloalkyl, the one or two optional substituents preferably comprise (e.g. is or are) OH and/or oxo (=O). In formula (IB), in the R³ heterocyclic group of sub-formula (aa), (bb) or (cc), the one or two optional substituents preferably comprise (e.g. is or are) OH and/or oxo.
- 15 Examples 1-203 are examples of compounds or salts of the third aspect of the invention (Formula (IB)).
- 20 The preferred or optional features for the compound or salt of formula (IA) and for the compound or salt of formula (IB) are the same as or similar to the preferred or optional features for the compound or salt of formula (I), with all necessary changes (for example to the formula, to the R groups and/or to substituents) having been made. Generally, whenever formula (I) is mentioned herein, then in alternative embodiments the statement
- 25 mentioning formula (I) applies to formula (IA) or formula (IB), with all necessary changes having been made.
- 30 **Salts, solvates, isomers, tautomeric forms, molecular weights, etc.**
- Because of their potential use in medicine, the salts of the compounds of formula (I) are preferably pharmaceutically acceptable. Suitable pharmaceutically acceptable salts can include acid or base addition salts. A pharmaceutically acceptable acid addition salt can
- 35 be formed by reaction of a compound of formula (I) with a suitable inorganic or organic acid (such as hydrobromic, hydrochloric, sulfuric, nitric, phosphoric, succinic, maleic, acetic, fumaric, citric, tartaric, benzoic, p-toluenesulfonic, methanesulfonic or naphthalenesulfonic acid), optionally in a suitable solvent such as an organic solvent, to give the salt which is usually isolated for example by crystallisation and filtration. A
- 40 pharmaceutically acceptable acid addition salt of a compound of formula (I) can be for example a hydrobromide, hydrochloride, sulfate, nitrate, phosphate, succinate, maleate,

acetate, fumarate, citrate, tartrate, benzoate, p-toluenesulfonate, methanesulfonate or naphthalenesulfonate salt. A pharmaceutically acceptable base addition salt can be formed by reaction of a compound of formula (I) with a suitable inorganic or organic base, optionally in a suitable solvent such as an organic solvent, to give the base addition salt which is usually isolated for example by crystallisation and filtration. Other suitable pharmaceutically acceptable salts include pharmaceutically acceptable metal salts, for example pharmaceutically acceptable alkali-metal or alkaline-earth-metal salts such as sodium, potassium, calcium or magnesium salts; in particular pharmaceutically acceptable metal salts of one or more carboxylic acid moieties that may be present in the the compound of formula (I).

Other non-pharmaceutically acceptable salts, eg. oxalates, may be used, for example in the isolation of compounds of the invention, and are included within the scope of this invention.

The invention includes within its scope all possible stoichiometric and non-stoichiometric forms of the salts of the compounds of formula (I).

Also included within the scope of the invention are all solvates, hydrates and complexes of compounds and salts of the invention.

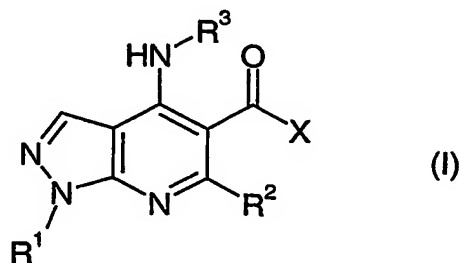
Certain groups, substituents, compounds or salts included in the present invention may be present as isomers. The present invention includes within its scope all such isomers, including racemates, enantiomers and mixtures thereof.

Certain of the groups, e.g. heteroaromatic ring systems, included in compounds of formula (I) or their salts may exist in one or more tautomeric forms. The present invention includes within its scope all such tautomeric forms, including mixtures.

Especially when intended for oral medicinal use, the compound of formula (I) can optionally have a molecular weight of 1000 or less, for example 800 or less, in particular 650 or less or 600 or less. Molecular weight here refers to that of the unsolvated "free base" compound, that is excluding any molecular weight contributed by any addition salts, solvent (e.g. water) molecules, etc.

Synthetic Process Routes

The following processes can be used to make the compounds of the invention:



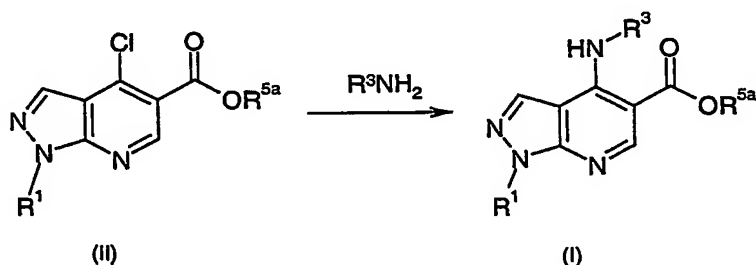
Most of the following synthetic processes following are exemplified for compounds of Formula (I) wherein R^2 is a hydrogen atom (H). However, some or all of these processes can also be used with appropriate modification, e.g. of starting materials and reagents, for making compounds of Formula (I) wherein R^2 is other than H.

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Process A

Compounds of formula (I) where $X = OR^{5a}$, can be prepared according to the method described by Yu et. al. in *J. Med Chem.*, 2001, 44, 1025-1027, by reaction of a compound of formula (II) with an amine of formula R^3NH_2 . The reaction is preferably carried out in the presence of a base such as triethylamine or N,N-diisopropylethylamine, and/or in an organic solvent such as ethanol, dioxane or acetonitrile. The reaction may require heating e.g. to ca. 60-100 °C, for example ca. 80-90 °C:

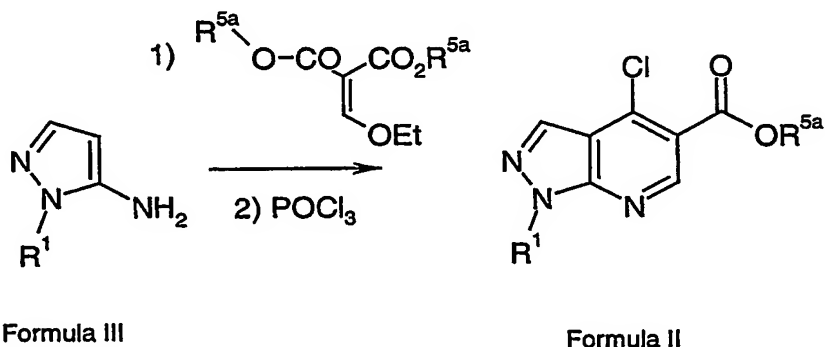
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Compounds of formula (II) are also described in the above reference and can be prepared by reaction of a compound of formula (III) with, for example, diethylethoxymethylene malonate (where $R^{5a} = Et$) with heating, followed by reaction with phosphorous oxychloride, again with heating:

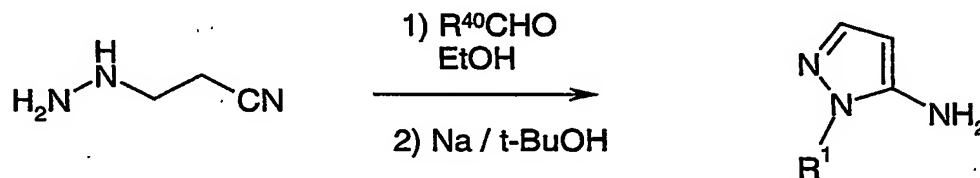
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Where the desired amino pyrazole of formula (III) is not commercially available (for example $R^1 = CH_2Ph$), preparation can be achieved using methods described by Dorgan et. al. in *J. Chem. Soc., Perkin Trans. 1*, (4), 938-42; 1980, by reaction of cyanoethylhydrazine with a suitable aldehyde of formula $R^{40}CHO$ in a solvent such as ethanol, with heating, followed by reduction with, for example sodium in a solvent such

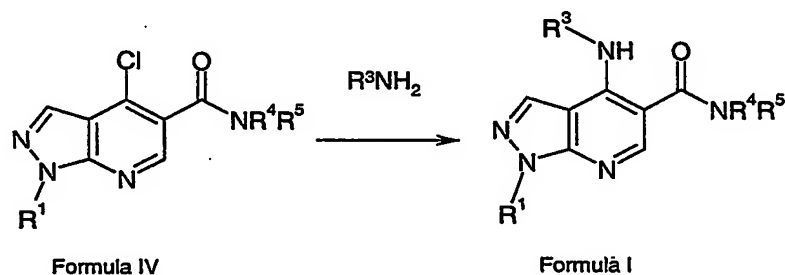
as t-butanol. R^{40} should be chosen so as to contain one less carbon atom than R^1 , for example R^{40} = methyl will afford R^1 = ethyl.



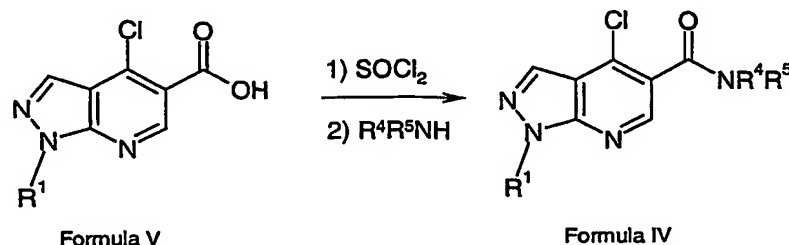
Formula III

5 Process B

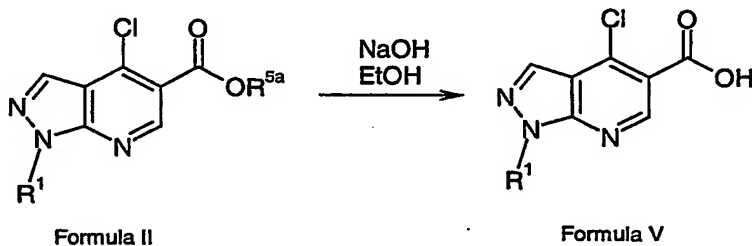
- Compounds of formula (I) where $X = NR^4R^5$, can be prepared by reaction of a compound of formula (IV) with an amine of formula R^3NH_2 . The reaction is preferably carried out in the presence of a base, such as triethylamine or N,N-diisopropylethylamine, and/or in an organic solvent such as ethanol, THF, dioxane or acetonitrile. The reaction may require heating, e.g. to ca. 60-100 °C or ca. 80-90 °C, for example for 8-48 or 12-24 hours:



- Compounds of formula (IV) can be prepared in a two step procedure as described by Bare et. al. in *J. Med. Chem.* 1989, 32, 2561-2573. This process involves, first, reaction of a compound of formula (V) with thionyl chloride (or another agent suitable for forming an acid chloride from a carboxylic acid), either in an organic solvent such as chloroform or THF, or as a neat solution. This reaction may require heating and the thus-formed intermediate may or may not be isolated. Step two involves reaction with an amine of formula R^4R^5NH , in an organic solvent such as THF or chloroform and may also involve the use of a base such as triethylamine or diisopropylethyl amine:

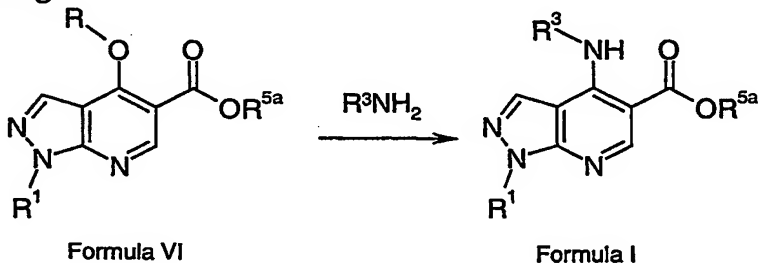


Compounds of formula (V) can be prepared by hydrolysis of an ester of formula (II) according to the method described by Yu et. al. in *J. Med. Chem.*, 2001, 44, 1025-1027. This procedure preferably involves reaction with a base such as sodium hydroxide or potassium hydroxide in a solvent e.g. an aqueous solvent such as aqueous ethanol or aqueous dioxane:

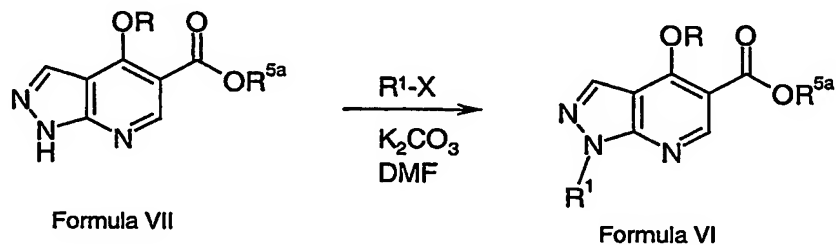


Process C

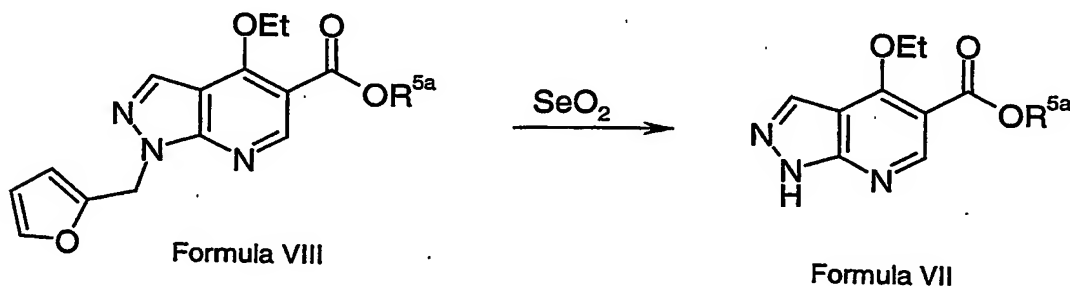
Compounds of formula (I) can also be prepared according to the method described by Bare et. al. in *J. Med. Chem.* 1989, 32, 2561-2573, which involves reaction of a compound of formula (VI), in which -O-R is -O-C₁₋₄alkyl, in particular -O-Et, with an amine of formula R³NH₂. The reaction may be carried out with or without solvent and may require heating.



Compounds of formula (VI) (also described in the above reference) can be prepared by reaction of a compound of formula (VII) with a suitable alkylating agent of formula R¹-X, where X is a leaving group such as halogen. The reaction should be carried out in the presence of a base such as potassium carbonate, in an anhydrous solvent such as DMF:



The preparation of compounds of formula VII by oxidative cleavage of compounds of formula VIII is described by Bare et. al. in *J. Med. Chem.* 1989, 32, 2561-2573 (further referred to Zuleski et. al. in *J. Drug. Metab. Dispos.*, 1985, 13,139).



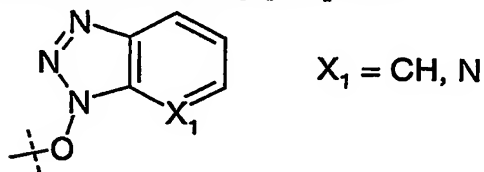
Process D:

To form a compound of formula (I) wherein $X = NR^4R^5$, a compound of formula (I) but wherein $X = OH$ (a carboxylic acid) can be converted into an activated compound of formula (I) but wherein $X =$ a leaving group substitutable by an amine; and subsequently the activated compound can be reacted with an amine of formula R^4R^5NH .

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For example, the activated compound can be the acid chloride i.e. an activated compound of formula (I) but wherein the leaving group $X = Cl$. This can be formed from the carboxylic acid ($X = OH$) e.g. by reaction with thionyl chloride. See for example Examples 81-85. Alternatively, the activated compound can be an activated ester wherein the leaving group X is

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The latter activated compound can be formed from the carboxylic acid ($X = OH$) either:

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(a) by reaction of the carboxylic acid with a carbodiimide such as EDC, which is 1-ethyl-3-(3'-dimethylaminopropyl)carbodiimide and is also 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide, or a salt thereof e.g. hydrochloride salt, followed by reaction of the resulting product with 1-hydroxybenzotriazole (HOBT); reaction (a) usually being carried out in the presence of a solvent such as dimethyl formamide (DMF) and/or usually at room temperature (e.g. about 20 to about 25 °C); or

25

(b) by reaction with 2-(1H-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium tetrafluoroborate (TBTU) or O-(7-Azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate (HATU), in the presence of a base such as diisopropylethylamine ($iPr_2Net = DIPEA$), and usually in the presence of a solvent such as dimethyl formamide (DMF) and/or usually at room temperature (e.g. about 20 to about 25 °C).

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The present invention therefore also provides a method of preparing a compound of formula (I) or a salt thereof, comprising :

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(a) for a compound of formula (I) wherein $X = OR^{5a}$, reaction of a compound of formula (II) with an amine of formula R^3NH_2 , or

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(b) for a compound of formula (I) wherein $X = NR^4R^5$, reaction of a compound of formula (IV) with an amine of formula R^3NH_2 , or

(c) reaction of a compound of formula (VI), in which -O-R is -O-C₁₋₄alkyl, with an amine of formula R^3NH_2 ;

15

(d) to form a compound of formula (I) wherein $X = NR^4R^5$, conversion of a compound of formula (I) but wherein $X = OH$ (a carboxylic acid) into an activated compound of formula (I) but wherein $X =$ a leaving group substitutable by an amine (preferably, the activated compound can be the acid chloride i.e. an activated compound of formula (I) but wherein $X = Cl$), and subsequent reaction of the activated compound with an amine of

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formula R^4R^5NH ;
and optionally converting the compound of formula (I) into a salt e.g. a pharmaceutically acceptable salt.

25 Medical uses

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The present invention also provides a compound of formula (I) or a pharmaceutically acceptable salt thereof for use as an active therapeutic substance in a mammal such as a human. The compound or salt can be for use in the treatment and/or prophylaxis of any of the conditions described herein (e.g. for use in the treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal) and/or for use as a phosphodiesterase inhibitor e.g. for use as a phosphodiesterase 4 (PDE4) inhibitor. "Therapy" may include treatment and/or prophylaxis.

35

Also provided is the use of a compound of formula (I) or a pharmaceutically acceptable salt thereof in the manufacture of a medicament (e.g. pharmaceutical composition) for the treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal such as a human.

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Also provided is a method of treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal (e.g. human) in need thereof, which comprises

administering to the mammal (e.g. human) a therapeutically effective amount of a compound of formula (I) as herein defined or a pharmaceutically acceptable salt thereof.

5 Phosphodiesterase 4 inhibitors are thought to be useful in the treatment and/or prophylaxis of a variety of diseases, especially inflammatory and/or allergic diseases, in mammals such as humans, for example: asthma, chronic bronchitis, emphysema, atopic dermatitis, urticaria, allergic rhinitis, allergic conjunctivitis, vernal conjunctivitis, eosinophilic granuloma, psoriasis, rheumatoid arthritis, septic shock, ulcerative colitis, Crohn's disease, reperfusion injury of the myocardium and brain, chronic
10 glomerulonephritis, endotoxic shock, adult respiratory distress syndrome, or multiple sclerosis.

In the treatment and/or prophylaxis, the inflammatory and/or allergic disease is preferably chronic obstructive pulmonary disease (COPD), asthma, or allergic rhinitis in a mammal
15 (e.g. human). More preferably, the treatment and/or prophylaxis is of COPD or asthma in a mammal (e.g. human). PDE4 inhibitors are thought to be effective in the treatment of asthma (e.g. see M.A.Giembycz, *Drugs*, Feb. 2000, 59(2), 193-212; Z. Huang et al., *Current Opinion in Chemical Biology*, 2001, 5: 432-438; and refs cited therein) and COPD (e.g. see S.L. Wolda, *Emerging Drugs*, 2000, 5(3), 309-319; Z. Huang et al.,
20 *Current Opinion in Chemical Biology*, 2001, 5: 432-438; and refs cited therein). COPD is often characterised by the presence of airflow obstruction due to chronic bronchitis and/or emphysema (SL Wolda, 2000).

25 **Pharmaceutical compositions and dosing**

For use in medicine, the compounds of the present invention are usually administered as a pharmaceutical composition.

The present invention therefore provides in a further aspect a pharmaceutical composition comprising a compound of formula (I) or a pharmaceutically acceptable salt thereof and one or more pharmaceutically acceptable carriers and/or excipients.
30

The pharmaceutical composition can be for use in the treatment and/or prophylaxis of any of the conditions described herein.

The compounds of formula (I) and/or the pharmaceutical composition may be administered, for example, by oral, parenteral (e.g. intravenous, subcutaneous, or
35 intramuscular), inhaled or nasal administration. Accordingly, the pharmaceutical composition is preferably suitable for oral, parenteral (e.g. intravenous, subcutaneous, or intramuscular), inhaled or nasal administration. More preferably, the pharmaceutical composition is suitable for inhaled or oral administration, e.g. to a mammal such as a human. Inhaled administration involves topical administration to the lung e.g. by aerosol
40 or dry powder composition. Oral administration to a human is most preferred.

A pharmaceutical composition suitable for oral administration can be liquid or solid; for example it can be a syrup, suspension or emulsion, a tablet, a capsule or a lozenge.

5 A liquid formulation will generally consist of a suspension or solution of the compound or pharmaceutically acceptable salt in a suitable pharmaceutically acceptable liquid carrier(s), for example an aqueous solvent such as water, ethanol or glycerine, or a non-aqueous solvent, such as polyethylene glycol or an oil. The formulation may also contain a suspending agent, preservative, flavouring and/or colouring agent.

10 A pharmaceutical composition suitable for oral administration being a tablet can comprise one or more pharmaceutically acceptable carriers and/or excipients suitable for preparing tablet formulations. Examples of such carriers include lactose and cellulose. The tablet can also or instead contain one or more pharmaceutically acceptable excipients, for example binding agents, lubricants such as magnesium stearate, and/or tablet disintegrants.

15 A pharmaceutical composition suitable for oral administration being a capsule can be prepared using encapsulation procedures. For example, pellets containing the active ingredient can be prepared using a suitable pharmaceutically acceptable carrier and then filled into a hard gelatin capsule. Alternatively, a dispersion or suspension can be prepared using any suitable pharmaceutically acceptable carrier, for example an aqueous
20 gum or an oil and the dispersion or suspension then filled into a soft gelatin capsule.

Preferably the composition is in unit dose form such as a tablet or capsule for oral administration, e.g. for oral administration to a human.

25 A parenteral composition can comprise a solution or suspension of the compound or pharmaceutically acceptable salt in a sterile aqueous carrier or parenterally acceptable oil. Alternatively, the solution can be lyophilised; the lyophilised parenteral pharmaceutical composition can be reconstituted with a suitable solvent just prior to administration.

Compositions for nasal or inhaled administration may conveniently be formulated as aerosols, drops, gels or dry powders.

30 Aerosol formulations, e.g. for inhaled administration, can comprise a solution or fine suspension of the active substance in a pharmaceutically acceptable aqueous or non-aqueous solvent. Aerosol formulations can be presented in single or multidose quantities in sterile form in a sealed container, which can take the form of a cartridge or refill for use with an atomising device or inhaler. Alternatively the sealed container may be a
35 unitary dispensing device such as a single dose nasal inhaler or an aerosol dispenser fitted with a metering valve (metered dose inhaler) which is intended for disposal once the contents of the container have been exhausted.

Where the dosage form comprises an aerosol dispenser, it preferably contains a suitable propellant under pressure such as compressed air, carbon dioxide, or an organic
40 propellant such as a chlorofluorocarbon (CFC) or hydrofluorocarbon (HFC). Suitable CFC propellants include dichlorodifluoromethane, trichlorofluoromethane and dichlorotetrafluoroethane. Suitable HFC propellants include 1,1,1,2,3,3-

heptafluoropropane and 1,1,1,2-tetrafluoroethane. The aerosol dosage forms can also take the form of a pump-atomiser.

- For pharmaceutical compositions suitable and/or adapted for inhaled administration, it is preferred that the compound or salt of formula (I) is in a particle-size-reduced form, and more preferably the size-reduced form is obtained or obtainable by micronisation. Micronisation usually involves subjecting the compound/salt to abrasional forces in a fast-flowing circular/closed-path airstream often including a cyclone component. The preferable particle size (e.g. D50 value) of the size-reduced (e.g. micronised) compound or salt is about 0.5 to about 10 microns, e.g. about 1 to about 5 microns (e.g. as measured using laser diffraction). For example, it is preferable for the compound or salt of formula (I) to have a particle size defined by: a D10 of about 0.3 to about 3 microns (e.g. about 1 micron), and/or a D50 of about 1 to about 5 microns (e.g. about 2-3 microns), and/or a D90 of about 3 to about 10 microns (e.g. about 5-6 microns); for example as measured using laser diffraction. An illustrative non-limiting example of the preferred micronisation process is now given:

Micronisation Example: Micronisation of Example 518 or 518A

- Purpose: To micronize approximately 600-1000 mg of Example 518 or 518A (described hereinafter) using a Jetpharma MC1 micronizer.
- The parent (unmicronised) and micronised materials are analyzed for particle size by laser diffraction and crystallinity by PXRD.

Equipment and material

Equipment/material	Description and specification
Jetpharma MC1 Micronizer	Nitrogen supply: Air tank with 275psi rate tubing
Analytical balance	Sartorius Analytical
Top loader balance	Mettler PM400
Digital Caliper	VWR Electronic caliper
Vibrational spatula	Auto-spat Dispenser
Materials to be micronised	Example 518 or 518A

Procedure:

- The micronizer is assembled. The venturi protrusion distance from input port is adjusted to 1.0cm respectively and is measured with a micro-caliper to make sure that it is inserted correctly. The ring (R) and venturi (V) pressures are adjusted according to the values specified in the experimental design (refer to experimental section below) by adjusting the valves on the pressure gauges on the micronizer. The setup is checked for leakage by observing if there is any fluctuation in the reading of the pressure gauges.

Note that the venturi (V) pressure is kept at least 2 bars greater than the ring (R) pressure to prevent regurgitation of material.

Balance performance are checked with calibration weights. Specified amount of the parent material (see section on experimental run) is weighed into a plastic weigh boat.

- 5 The material is then fed into the micronizer using a vibrational spatula at a specified feed rate. The material feeding time and equipment pressures are monitored during the micronization process.

- 10 Upon completion of the micronising run, the nitrogen supply is shut off and the collection bag is tapped to allow particles to settle into the recovery vessel at the bottom of the micronizer. The collection bag is removed and set aside. The micronised powder on the recovery vessel and the cyclone (above the recovery vessel) are collected separately into different weighed+labelled collection vials. The weight of the micronised material is recorded. The micronizer is disassembled and residual PDE4 compound on the micronizer inner surface is rinsed with 70/30 isopropyl alcohol / water and collected into a flask. The micronizer is then thoroughly cleaned by rinsing and wiping with suitable solvent and dried before subsequent runs are performed.

Experimental runs

Parent (unmicronised) material: Example 518 or 518A

- 20 Balance(s) Used: Sartorius analytical

Venturi outlet insertion depth: 10.0 mm

Run #	Material input amount (g)	Venturi (V) / ring (R) Pressure (bar)	Intended feed-rate	Time needed to feed material (min+sec)	Actual feed-rate (g/min)
1	0.8795g	V= 10 bar R= 6 bar	200 mg/min	4 min 51 sec	0.181 g/min

Results and/or observations

- 25 % yield = [(Material from vessel + Material from cyclone)/Material input amount] x100
In general, very approximately 70% yields are achievable using this method.

Alternative embodiment: Examples of the compounds/salts of the invention other than Examples 518 or 518A can be micronised.

30

- 35 For pharmaceutical compositions suitable and/or adapted for inhaled administration, it is preferred that the pharmaceutical composition is a dry powder inhalable composition. Such a composition can comprise a powder base such as lactose or starch, the compound of formula (I) or salt thereof (preferably in particle-size-reduced form, e.g. in micronised form), and optionally a performance modifier such as L-leucine,

mannitol, trehalose and/or magnesium stearate. Preferably, the dry powder inhalable composition comprises a dry powder blend of lactose and the compound of formula (I) or salt thereof. The lactose is preferably lactose hydrate e.g. lactose monohydrate and/or is preferably inhalation-grade and/or fine-grade lactose. Preferably, the particle size of the lactose is defined by 90% or more (by weight or by volume) of the lactose particles being less than 1000 microns (micrometres) (e.g. 10-1000 microns e.g. 30-1000 microns) in diameter, and/or 50% or more of the lactose particles being less than 500 microns (e.g. 10-500 microns) in diameter. More preferably, the particle size of the lactose is defined by 90% or more of the lactose particles being less than 300 microns (e.g. 10-300 microns e.g. 50-300 microns) in diameter, and/or 50% or more of the lactose particles being less than 100 microns in diameter. Optionally, the particle size of the lactose is defined by 90% or more of the lactose particles being less than 100-200 microns in diameter, and/or 50% or more of the lactose particles being less than 40-70 microns in diameter. Most importantly, it is preferable that about 3 to about 30% (e.g. about 10%) (by weight or by volume) of the particles are less than 50 microns or less than 20 microns in diameter. For example, without limitation, a suitable inhalation-grade lactose is E9334 lactose (10% fines) (Borculo Domo Ingredients, Hanzeplein 25, 8017 JD Zwolle, Netherlands).

In the dry powder inhalable composition, preferably, the compound of formula (I) or salt thereof is present in about 0.1% to about 70% (e.g. about 1% to about 50%, e.g. about 5% to about 40%, e.g. about 20 to about 30%) by weight of the composition.

An illustrative non-limiting example of a dry powder inhalable composition follows:

Dry Powder Formulation Example - Dry powder Lactose Blend Preparation

Using a size-reduced e.g. micronised form of the compound of formula (I) or salt thereof (e.g. as prepared in the Micronisation Example above), the dry powder blend is prepared by mixing the required amount of the compound/salt (e.g. 10 mg, 1% w/w) with inhalation-grade lactose containing 10% fines (e.g. 990 mg, 99% w/w) in a Teflon™ (polytetrafluoroethene) pot in a Mikro-dismembrator ball-mill (but without a ball bearing) at ¼ speed (ca. 2000-2500 rpm) for about 4 hours at each blend concentration. The Mikro-dismembrator ball-mill (without the ball) (available from B. Braun Biotech International, Schwarzenberger Weg 73-79, D-34212 Melsungen, Germany; www.bbraunbiotech.com) comprises a base with an upwardly-projecting and sidewardly-vibratable arm to which is attached the Teflon™ pot. The vibration of the arm achieves blending.

Other blends: 10% w/w compound/salt (50 mg) + 90% w/w lactose (450 mg, inhalation-grade lactose containing 10% fines).

Serial dilution of the 1% w/w blend can achieve e.g. 0.1% and 0.3% w/w blends.

Optionally, in particular for dry powder inhalable compositions, a pharmaceutical composition for inhaled administration can be incorporated into a plurality of sealed dose containers (e.g. containing the dry powder composition) mounted longitudinally in a strip or ribbon inside a suitable inhalation device. The container is rupturable or peel-openable

on demand and the dose, e.g. of the dry powder composition, can be administered by inhalation via the device such as the DISKUSTM device, marketed by GlaxoSmithKline. The DISKUSTM inhalation device is usually substantially as described in GB 2,242,134

A. In such device at least one container for the pharmaceutical composition in powder form (the at least one container preferably being a plurality of sealed dose containers mounted longitudinally in a strip or ribbon) is defined between two members peelably secured to one another; the device comprises: means defining an opening station for the said at least one container; means for peeling the members apart at the opening station to open the container; and an outlet, communicating with the opened container, through which a user can inhale the pharmaceutical composition in powder form from the opened container.

In the pharmaceutical composition, a or each dosage unit for oral or parenteral administration preferably contains from 0.01 to 3000 mg, more preferably 0.5 to 1000 mg, of a compound of the formula (I) or a pharmaceutically acceptable salt thereof, calculated as the free base. A or each dosage unit for nasal or inhaled administration preferably contains from 0.001 to 50 mg, more preferably 0.01 to 5 mg, of a compound of the formula (I) or a pharmaceutically acceptable salt thereof, calculated as the free base.

A pharmaceutically acceptable compound or salt of the invention is preferably administered to a mammal (e.g. human) in a daily oral or parenteral dose of 0.001 mg to 50 mg per kg body weight per day (mg/kg/day), for example 0.01 to 20 mg/kg/day or 0.03 to 10 mg/kg/day or 0.1 to 2 mg/kg/day, of the compound of the formula (I) or a pharmaceutically acceptable salt thereof, calculated as the free base.

A pharmaceutically acceptable compound or salt of the invention is preferably administered to a mammal (e.g. human) in a daily nasal or inhaled dose of: 0.0001 to 5 mg/kg/day, e.g. 0.001 to 1 mg/kg/day or 0.005 to 0.3 mg/kg/day, of the compound of the formula (I) or a pharmaceutically acceptable salt thereof, calculated as the free base.

The pharmaceutically acceptable compounds or salts of the invention is preferably administered in a daily dose (for an adult patient) of, for example, an oral or parenteral dose of 0.01 mg to 3000 mg per day or 0.5 to 1000 mg per day e.g. 2 to 500 mg per day, or a nasal or inhaled dose of 0.001 to 300 mg per day or 0.001 to 50 mg per day or 0.01 to 30 mg per day or 0.01 to 5 mg per day, of the compound of the formula (I) or a pharmaceutically acceptable salt thereof, calculated as the free base.

Combinations

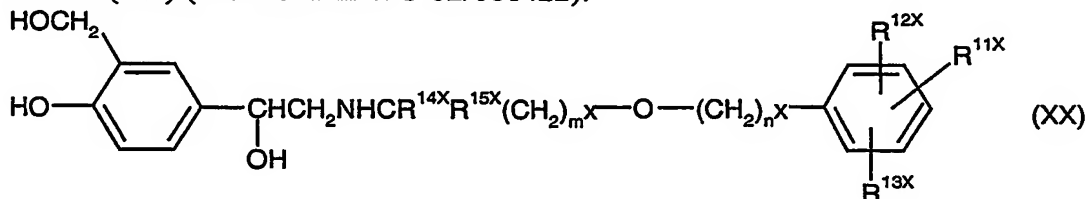
The compounds, salts and/or pharmaceutical compositions according to the invention may also be used in combination with another therapeutically active agent, for example, a β_2 adrenoreceptor agonist, an anti-histamine, an anti-allergic or an anti-inflammatory agent.

The invention thus provides, in a further aspect, a combination comprising a compound of formula (I) or a pharmaceutically acceptable salt thereof together with another therapeutically active agent, for example, a β_2 -adrenoreceptor agonist, an anti-histamine, an anti-allergic, an anti-inflammatory agent or an antiinfective agent.

Examples of β_2 -adrenoreceptor agonists include salmeterol (eg as racemate or a single enantiomer such as the R-enantiomer), salbutamol, formoterol, salmefamol, fenoterol or terbutaline and salts thereof, for example the xinafoate salt of salmeterol, the sulphate salt or free base of salbutamol or the fumarate salt of formoterol. Long-acting β_2 -adrenoreceptor agonists are preferred, especially those having a therapeutic effect over a 24 hour period such as salmeterol or formoterol.

Preferred long acting β_2 -adrenoreceptor agonists include those described in WO 02/066422A, WO 03/024439, WO 02/070490 and WO 02/076933.

Especially preferred long-acting β_2 -adrenoreceptor agonists include compounds of formula (XX) (described in WO 02/066422):



or a salt or solvate thereof, wherein in formula (XX):

m^X is an integer of from 2 to 8;

n^X is an integer of from 3 to 11,

with the proviso that $m^X + n^X$ is 5 to 19,

$\text{R}^{11\text{X}}$ is $-\text{XSO}_2\text{NR}^{16\text{X}}\text{R}^{17\text{X}}$ wherein X is $-(\text{CH}_2)_{p^X}-$ or C_{2-6} alkenylene;

$\text{R}^{16\text{X}}$ and $\text{R}^{17\text{X}}$ are independently selected from hydrogen, C_{1-6} alkyl, C_{3-7} cycloalkyl,

$\text{C(O)NR}^{18\text{X}}\text{R}^{19\text{X}}$, phenyl, and phenyl (C_{1-4} alkyl)-,

or $\text{R}^{16\text{X}}$ and $\text{R}^{17\text{X}}$, together with the nitrogen to which they are bonded, form a 5-, 6-, or 7-membered nitrogen containing ring, and $\text{R}^{16\text{X}}$ and $\text{R}^{17\text{X}}$ are each optionally substituted by one or two groups selected from halo, C_{1-6} alkyl, C_{1-6} haloalkyl, C_{1-6} alkoxy, hydroxy-substituted C_{1-6} alkoxy, $-\text{CO}_2\text{R}^{18\text{X}}$, $-\text{SO}_2\text{NR}^{18\text{X}}\text{R}^{19\text{X}}$, $-\text{CONR}^{18\text{X}}\text{R}^{19\text{X}}$, $-\text{NR}^{18\text{X}}\text{C(O)R}^{19\text{X}}$, or

a 5-, 6- or 7-membered heterocyclic ring;

$\text{R}^{18\text{X}}$ and $\text{R}^{19\text{X}}$ are independently selected from hydrogen, C_{1-6} alkyl,

C_{3-6} cycloalkyl, phenyl, and phenyl (C_{1-4} alkyl)-; and

p^X is an integer of from 0 to 6, preferably from 0 to 4;

$\text{R}^{12\text{X}}$ and $\text{R}^{13\text{X}}$ are independently selected from hydrogen, C_{1-6} alkyl, C_{1-6} alkoxy, halo,

phenyl, and C_{1-6} haloalkyl; and

$\text{R}^{14\text{X}}$ and $\text{R}^{15\text{X}}$ are independently selected from hydrogen and C_{1-4} alkyl with the proviso that the total number of carbon atoms in $\text{R}^{14\text{X}}$ and $\text{R}^{15\text{X}}$ is not more than 4.

Preferred β_2 -adrenoreceptor agonists disclosed in WO 02/066422 include:

- 3-(4-{{[6-{{(2R)-2-hydroxy-2-[4-hydroxy-3-(hydroxymethyl)-
phenyl]ethyl}amino)hexyl]oxy}butyl)benzenesulfonamide and
5 3-(3-{{[7-{{(2R)-2-hydroxy-2-[4-hydroxy-3-hydroxymethyl]phenyl]ethyl}-
amino)heptyl]oxy}propyl)benzenesulfonamide.

A preferred β_2 -adrenoreceptor agonist disclosed in WO 03/024439 is:

- 4-{{(1R)-2-{{[6-{{2-{{(2,6-dichlorobenzyl)oxy}ethoxy}hexyl)amino]-1-hydroxyethyl}-2-
10 (hydroxymethyl)phenol.

Examples of anti-histamines include methapyrilene or loratadine.

- 15 The invention also provides, in a further aspect, a combination comprising a compound of
formula (I) or a pharmaceutically acceptable salt thereof together with an anticholinergic
compound, e.g. a muscarinic (M) receptor antagonist in particular an M_1 , M_2 , M_1/M_2 , or
 M_3 receptor antagonist. For combinations of anticholinergic compounds / muscarinic
(M) receptor antagonist with PDE4 inhibitors, see for example WO 03/011274 A2 and
20 WO 02/069945 A2 / US 2002/0193393 A1 and US 2002/052312 A1, and some or all of
these publications give examples of anticholinergic compounds / muscarinic (M)
receptor antagonists which may be used with the compounds of formula (I) or salts.

- Other suitable combinations include, for example, other anti-inflammatory agents eg.
25 NSAIDs (eg. leukotriene antagonists, iNOS inhibitors, tryptase and elastase inhibitors,
beta-2 integrin antagonists and adenosine 2a agonists)) or antiinfective agents (eg.
antibiotics, antivirals).

- The combinations referred to above may conveniently be presented for use in the form of
30 a pharmaceutical composition and thus a pharmaceutical composition comprising a
combination as defined above together with one or more pharmaceutically acceptable
carriers and/or excipients represent a further aspect of the invention.

- The individual compounds of such combinations may be administered either sequentially
35 or simultaneously in separate or combined pharmaceutical composition.

BIOLOGICAL TEST METHODS**PDE 3, PDE 4B, PDE 4D, PDE 5, PDE 6 Primary assay methods**

- 5 The activity of the compounds can be measured in the assay methods shown below. Preferred compounds of the invention are selective PDE4 inhibitors, i.e. they inhibit PDE4 (e.g. PDE4B and/or PDE4D, preferably PDE4B) more strongly than they inhibit PDE3 and/or more strongly than they inhibit PDE5 and/or more strongly than they inhibit PDE6.

10

PDE enzyme sources and literature references

- Human recombinant PDE4B, in particular the 2B splice variant thereof (HSPDE4B2B), is disclosed in WO 94/20079 and also M.M. McLaughlin et al., "A low Km, rolipram-sensitive, cAMP-specific phosphodiesterase from human brain: cloning and expression of cDNA, biochemical characterisation of recombinant protein, and tissue distribution of mRNA", *J. Biol. Chem.*, 1993, **268**, 6470-6476. Human recombinant PDE4B was expressed in the PDE-deficient yeast *Saccharomyces cerevisiae* strain GL62. 100,000 x g supernatant fractions of yeast cell lysates were used for PDE4B assays and inhibitor studies.

20

Human recombinant PDE4D (HSPDE4D3A) is disclosed in P. A. Baecker et al., "Isolation of a cDNA encoding a human rolipram-sensitive cyclic AMP phosphodiesterase (PDE IV_D)", *Gene*, 1994, **138**, 253-256.

25

Human recombinant PDE5 is disclosed in K. Loughney et al., "Isolation and characterisation of cDNAs encoding PDE5A, a human cGMP-binding, cGMP-specific 3',5'-cyclic nucleotide phosphodiesterase", *Gene*, 1998, **216**, 139-147.

30

PDE3 was purified from bovine aorta as described by H. Coste and P. Grondin, "Characterisation of a novel potent and specific inhibitor of type V phosphodiesterase", *Biochem. Pharmacol.*, 1995, **50**, 1577-1585.

35

PDE6 was purified from bovine retina as described by: P. Catty and P. Deterre, "Activation and solubilization of the retinal cGMP-specific phosphodiesterase by limited proteolysis", *Eur. J. Biochem.*, 1991, **199**, 263-269; A. Tar et al. "Purification of bovine retinal cGMP phosphodiesterase", *Methods in Enzymology*, 1994, **238**, 3-12; and/or D. Srivastava et al. "Effects of magnesium on cyclic GMP hydrolysis by the bovine retinal rod cyclic GMP phosphodiesterase", *Biochem. J.*, 1995, **308**, 653-658.

40

Inhibition of PDE 3, PDE 4B, PDE 4D, PDE 5 or PDE 6 activity

The ability of compounds to inhibit catalytic activity at PDE4B or 4D (human recombinant), PDE3 (from bovine aorta), PDE5 (human recombinant) or PDE6 (from bovine retina) was determined by Scintillation Proximity Assay (SPA) in 96-well format. Test compounds were preincubated at ambient temperature (room temperature) in Wallac Isoplates (code 1450-514) with PDE enzyme in 50mM Tris-HCl buffer pH 7.5 , 8.3mM MgCl₂, 1.7mM EGTA, 0.05% (w/v) bovine serum albumin for 10-30 minutes (usually 30 minutes). The enzyme concentration was adjusted so that no more than 20% hydrolysis of the substrate defined below occurred in control wells without compound, during the incubation. For the PDE3, PDE4B and PDE4D assays, [5',8-³H]Adenosine 3',5'-cyclic phosphate (Amersham Pharmacia Biotech , code TRK.559) was added to give 0.05uCi per well and ~ 10nM final concentration. For the PDE5 and PDE6 assays, [8-³H]Guanosine 3',5'-cyclic phosphate (Amersham Pharmacia Biotech , code TRK.392) was added to give 0.05uCi per well and ~ 36nM final concentration. Plates were mixed on an orbital shaker for 5 minutes and incubated at ambient temperature for 1 hour. Phosphodiesterase SPA beads (Amersham Pharmacia Biotech, code RPNQ 0150) were added (~1mg per well) to terminate the assay. Plates were sealed and shaken and allowed to stand at ambient temperature for 35 minutes to 1hour (preferably 35 minutes) to allow the beads to settle. Bound radioactive product was measured using a WALLAC TRILUX 1450 Microbeta scintillation counter. For inhibition curves, 10 concentrations (1.5nM - 30uM) of each compound were assayed. Curves were analysed using ActivityBase and XLfit (ID Business Solutions Limited) Results were expressed as pIC₅₀ values.

Biological Data obtained for some of the Examples (PDE4B inhibitory activity, either as one reading or as an average of ca. 2-6 readings) are as follows, based on current measurements only. Absolute accuracy is not possible, and the readings given are accurate only up to about ± 0.5 of a log unit, depending on the number of readings made and averaged:

Example number	PDE4B pIC ₅₀
2	8.0
3	7.8
6	6.6
11	7.4
21	8.5
22	7.9
32	7.7
40	8.3
63	6.9
1, 36, 39, 41, 42, 43, 44, 47, 48, 63, 83, 109, 178, 187 and 600	7.0 to 7.9

100, 155, 165, 167, 201, 260, 261, 263, 265, 266, 267, 271, 493, 494, 495, 498, 518, 518A, 551, 575, 581, 584, 619, 622, 624-626, 628, 630, 636, 638, 643-645 and 653	8.2 to 9.6
196	7.9
198	8.5

The Examples, excluding reference examples 19-20, have PDE4B inhibitory activities in the range of pIC_{50} = about 5.5 (\pm about 0.5) to about 9.6 (\pm about 0.5). Most (about 95% or more) of the Examples, excluding reference examples 19-20, have PDE4B inhibitory activities in the range of about 6 (\pm about 0.5) to about 9.6 (\pm about 0.5).

The Examples wherein R^3 = cyclohexyl (NHR^3 = sub-formula (c)), tetrahydro-2H-pyran-4-yl (NHR^3 = group (h)), 4-oxocyclohexyl (NHR^3 = sub-formula (o)), or certain other types of substituted cyclohexyl or certain heterocycles, usually or often (especially with R^1 = ethyl) have a higher level of selectivity for PDE4B over PDE5, as measured in the above enzyme inhibition assays, compared to the selectivities of comparable Examples wherein R^3 = cyclopropyl (NHR^3 = sub-formula (b)). For example, based on current measurements only, and subject to cumulative assay inaccuracies:

- Examples 21, 40, 90, 198 and 201 (wherein NHR^3 = sub-formula (h), (c), (j), (n) and (o) respectively, R^1 = ethyl) have selectivities for PDE4B over PDE5 in the range of about 3 to 20 or more times greater than the selectivity achieved for the equivalent Example 39 wherein R^3 = cyclopropyl (NHR^3 = sub-formula (b));
- Examples 43 and 44 (wherein NHR^3 = sub-formula (c) and (h) respectively) have selectivities for PDE4B over PDE5 in the range of about 4 to 8 or more times greater than the selectivity achieved for the equivalent R^3 = cyclopropyl Example 42;
- Examples 22 and 48 (wherein NHR^3 = sub-formula (h) and (c) respectively) have selectivities for PDE4B over PDE5 in the range of about 2.5 to 10 or more times greater than the selectivity achieved for the equivalent R^3 = cyclopropyl Example 47; and
- Examples 2 and 3 (wherein NHR^3 = sub-formula (c) and (h) respectively) have selectivities for PDE4B over PDE5 in the range of about 2 to 5 or more times greater than the selectivity achieved for the equivalent R^3 = cyclopropyl Example 1.

Emesis: Some known PDE4 inhibitors can cause emesis and/or nausea to greater or lesser extents (e.g. see Z. Huang et al., *Current Opinion in Chemical Biology*, 2001, 5: 432-438, see especially pages 433-434 and refs cited therein). Therefore, it would be preferable, but not essential, if a PDE4 inhibitory compound or salt of the invention were to cause only limited or manageable emetic side-effects. Emetic side-effects can for example be measured by the emetogenic potential of the compound or salt when

administered to ferrets; for example one can measure the time to onset, extent, frequency and/or duration of vomiting, retching and/or writhing in ferrets after oral or parenteral administration of the compound or salt. See for example A. Robichaud et al., "Emesis induced by inhibitors of [PDE IV] in the ferret", *Neuropharmacology*, 1999, 38, 289-297, erratum *Neuropharmacology*, 2001, 40, 465-465. However, more preferably, emetic side-effects and therapeutic index in rats can be conveniently measured by monitoring the pica feeding behaviour of rats after administration of the compound or salt of the invention (see In Vivo Assay 2 below).

- 10 **Other side effects:** Some known PDE4 inhibitors can cause other side effects such as headache and other central nervous system (CNS-) mediated side effects; and/or gastrointestinal (GI) tract disturbances. Therefore, it would be preferable but not essential if a particular PDE4 inhibitory compound or salt of the invention were to cause only limited or manageable side-effects in one or more of these side-effect categories.

15

In Vivo Biological Assays

- The *in vitro* enzymatic PDE4B inhibition assay described above should be regarded as being the primary test of biological activity. However, additional *in vivo* biological tests, which are optional and which are not an essential measure of efficacy or side-effects, are described below.

20

In Vivo Assay 1. LPS-induced pulmonary neutrophilia in rats: effect of orally administered PDE4 inhibitors

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- Pulmonary neutrophil influx has been shown to be a significant component to the family of pulmonary diseases like chronic obstructive pulmonary disease (COPD) which can involve chronic bronchitis and/or emphysema (G.F. Filley, *Chest*. 2000; 117(5); 251s-260s). The purpose of this neutrophilia model is to study the potentially anti-inflammatory effects *in vivo* of orally administered PDE4 inhibitors on neutrophilia induced by inhalation of aerosolized lipopolysaccharide (LPS), modelling the neutrophil inflammatory component(s) of COPD. See the literature section below for scientific background.

30

- Male Lewis rats (Charles River, Raleigh, NC, USA) weighing approximately 300-400 grams are pretreated with either (a) test compound suspended in 0.5% methylcellulose (obtainable from Sigma-Aldrich, St Louis, MO, USA) in water or (b) vehicle only, delivered orally in a dose volume of 10 ml/kg. Generally, dose response curves are generated using the following doses of PDE4 inhibitors: 10.0, 2.0, 0.4, 0.08 and 0.016 mg/kg. Thirty minutes following pretreatment, the rats are exposed to aerosolized LPS (Serotype E. Coli 026:B6 prepared by trichloroacetic acid extraction, obtainable from Sigma-Aldrich, St Louis, MO, USA), generated from a nebulizer containing a 100 µg/ml LPS solution. Rats are exposed to the LPS aerosol at a rate of 4 L/min for 20 minutes. LPS exposure is carried out in a closed chamber with internal dimensions of 45 cm length x 24 cm width x 20 cm height. The nebulizer and exposure chamber are contained in a certified fume hood. At 4 hours-post LPS exposure the rats

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are euthanized by overdose with pentobarbital at 90 mg/kg, administered intraperitoneally. Bronchoalveolar lavage (BAL) is performed through a 14 gauge blunt needle into the exposed trachea. Five, 5 ml washes are performed to collect a total of 25 ml of BAL fluid. Total cell counts and leukocyte differentials are performed on BAL fluid in order to calculate neutrophil influx into the lung. Percent neutrophil inhibition at each dose (cf. vehicle) is calculated and a variable slope, sigmoidal dose-response curve is generated, usually using Prism Graph-Pad. The dose-response curve is used to calculate an ED50 value (in mg per kg of body weight) for inhibition by the PDE4 inhibitor of the LPS-induced neutrophilia.

Results: Based on current measurements, the compounds of Examples 22, 83 and 155, administered orally in the above procedure, exhibited neutrophilia-inhibition ED50 values in the range of about 0.5 mg/kg to about 2 mg/kg.

Alternative method and results: In an alternative embodiment of the procedure, single oral doses of 10 mg/kg or 1.0 mg/kg of the PDE4 inhibitor (or vehicle) is administered to the rats, and percent neutrophil inhibition is calculated and reported for that specific dose. In this embodiment, based on current measurements, the compounds of Examples 21, 100, 109, 167, 172 and 600, administered orally in the above procedure at a single dose of 1.0 mg/kg, exhibited percent neutrophilia-inhibition in the range of about 19% to about 69% (or in the range of about 32% to about 69% for Examples 21, 100, 109, 167 and 600).

Literature:

Filley G.F. Comparison of the structural and inflammatory features of COPD and asthma. *Chest*. 2000; 117(5) 251s-260s.

Howell RE, Jenkins LP, Fielding LE, and Grimes D. Inhibition of antigen-induced pulmonary eosinophilia and neutrophilia by selective inhibitors of phosphodiesterase types 3 and 4 in brown Norway rats. *Pulmonary Pharmacology*. 1995; 8: 83-89.

Spond J, Chapman R, Fine J, Jones H, Kreutner W, Kung TT, Minnicozzi M. Comparison of PDE 4 inhibitors, Rolipram and SB 207499 (Ariflo™), in a rat model of pulmonary neutrophilia. *Pulmonary Pharmacology and Therapeutics*. 2001; 14: 157-164.

Underwood DC, Osborn RR, Bochnowicz S, Webb EF, Rieman DJ, Lee JC, Romanic AM, Adams JL, Hay DWP, and Griswold DE. SB 239063, a p38 MAPK inhibitor, reduces neutrophilia, inflammatory cytokines, MMP-9, and fibrosis in lung. *Am J Physiol Lung Cell Mol Physiol*. 2000; 279: L895-L902.

In Vivo Assay 2. Rat Pica Model of emesis

Background: Selective PDE4 inhibitors have been shown to inhibit inflammation in various *in vitro* and *in vivo* models by increasing intracellular levels of cAMP of many immune cells (e.g. lymphocytes, monocytes). However, a side effect of some PDE4 inhibitors in many species is emesis. Because many rat models of inflammation are well characterized, they have been used in procedures (see e.g. In Vivo Assay 1 above) to show beneficial anti-inflammatory effects of PDE 4 inhibitors. However rats have no emetic response (they have no vomit reflex), so that the relationship between beneficial anti-inflammatory effects of PDE 4 inhibitors and emesis is difficult to study directly in rats.

However, in 1991, Takeda *et al.* (see Literature section below) demonstrated that the pica feeding response is analogous to emesis in rats. Pica feeding is a behavioural

response to illness in rats wherein rats eat non-nutritive substances such as earth or in particular clay (e.g. kaolin) which may help to absorb toxins. Pica feeding can be induced by motion and chemicals (especially chemicals which are emetic in humans), and can be inhibited pharmacologically with drugs that inhibit emesis in humans. The Rat Pica Model, In Vivo Assay 2, can determine the level of pica response of rats to PDE 4 inhibition at pharmacologically relevant doses in parallel to *in vivo* anti-inflammatory Assays in (a separate set of) rats (e.g. In Vivo Assay 1 above). Anti-inflammatory and pica assays in the same species together can provide data on the "therapeutic index" (TI) in the rat of the compounds/salts of the invention. The Rat TI can for example be calculated as the ratio of a) the potentially-emetic Pica Response ED50 dose from Assay 2 to b) the rat anti-inflammatory ED50 dose (e.g. measured by rat neutrophilia-inhibition in eg In Vivo Assay 1), with larger TI ratios possibly indicating lower emesis at many anti-inflammatory doses. This might allow a choice of a non-emetic or minimal-emetic pharmaceutical dose of the compounds or salts of the invention which has an anti-inflammatory effect. It is recognised however that achieving a low-emetic PDE4 inhibitory compound is not essential.

Procedure: On the first day of the experiment, the rats are housed individually in cages without bedding or "enrichment". The rats are kept off of the cage floor by a wire screen. Pre-weighed food cups containing standard rat chow and clay pellets are placed in the cage. The clay pellets, obtainable from Languna Clay Co, City of Industry, CA, USA, are the same size and shape as the food pellets. The rats are acclimated to the clay for 72 hours, during which time the cups and food and clay debris from the cage are weighed daily on an electronic balance capable of measuring to the nearest 0.1 grams. By the end of the 72 hour acclimation period the rats generally show no interest in the clay pellets.

At the end of 72 hours the rats are placed in clean cages and the food cups weighed. Rats that are still consuming clay regularly are removed from the study. Immediately prior to the dark cycle (the time when the animals are active and should be eating) the animals are split into treatment groups and dosed orally with a dose of the compound/salt of the invention (different doses for different treatment groups) or with vehicle alone, at a dose volume of 2 ml/kg. In this oral dosing, the compound/salt is in the form of a suspension in 0.5% methylcellulose (obtainable Sigma-Aldrich, St. Louis, MO, USA) in water. The food and clay cups and cage debris are weighed the following day and the total clay and food consumed that night by each individual animal is calculated.

A dose response is calculated by first converting the data into quantal response, where animals are either positive or negative for the pica response. A rat is "pica positive" if it consumes greater than or equal to 0.3 grams of clay over the mean of is usually calculated using logistic regression performed by the Statistica software statistical package. A Pica Response ED50 value in mg per kg of body weight can then be calculated.

Results: Using the above procedure, and according to current measurements, the compounds of Examples 22, 83 and 155 exhibited a Pica Response ED50 in the range of about 4.8 mg/kg to greater than or equal to about 40 mg/kg. It can be seen that these Pica Response ED50 doses are higher than the neutrophilia-inhibition ED50 values for these three Examples (see In Vivo Assay 1 above), so that a Therapeutic Index in rats of >2, as measured by Assays 1+2 and according to current measurements, appears at first sight to have been achieved for these three Examples.

Literature:

Beavo JA, Contini, M., Heaslip, R.J. Multiple cyclic nucleotide phosphodiesterases. *Mol Pharmacol.* 1994; 46:399-405.

- 5 Spond J, Chapman R, Fine J, Jones H, Kreutner W, Kung TT, Minnicozzi M. Comparison of PDE 4 inhibitors, Rolipram and SB 207499 (Ariflo™), in a rat model of pulmonary neutrophilia. *Pulmonary Pharmacology and Therapeutics.* 2001; 14:157-164.

- 10 Takeda N, Hasegawa S, Morita M, and Matsunaga T. Pica in rats is analogous to emesis: an animal model in emesis research. *Pharmacology, Biochemistry and Behavior.* 1991; 45:817-821.

Takeda N, Hasegawa S, Morita M, Horii A, Uno A, Yamatodani A and Matsunaga T. Neuropharmacological mechanisms of emesis. I. Effects of antiemetic drugs on motion- and apomorphine-induced pica in rats. *Meth Find Exp Clin Pharmacol.* 1995; 17(9) 589-596.

- 15 Takeda N, Hasegawa S, Morita M, Horii A, Uno A, Yamatodani A and Matsunaga T. Neuropharmacological mechanisms of emesis. II. Effects of antiemetic drugs on cisplatin-induced pica in rats. *Meth Find Exp Clin Pharmacol.* 1995; 17(9) 647-652.

- 20 ***In Vivo Assay 3. LPS induced pulmonary neutrophilia in rats: effect of intratracheally administered PDE4 inhibitors***

- 25 This assay is an animal model of inflammation in the lung – specifically neutrophilia induced by lipopolysaccharide (LPS) – and allows the study of putative inhibition of such neutrophilia (anti-inflammatory effect) by intratracheally (i.t.) administered PDE4 inhibitors. The PDE4 inhibitors are preferably in dry powder or wet suspension form. I.t. administration is one model of inhaled administration, allowing topical delivery to the lung.

- 30 ***Animals:*** Male CD (Sprague Dawley Derived) rats supplied by Charles River, Raleigh, NC, USA were housed in groups of 5 rats per cage, acclimatised after delivery for at least 7 days with bedding/nesting material regularly changed, fed on SDS diet R1 pelleted food given *ad lib*, and supplied with daily-changed pasteurised animal grade drinking water.

- 35 ***Device for dry powder administration:*** Disposable 3-way tap between dosing needle and syringe. A 3-way sterile tap (Vycon Ref 876.00) was weighed, the drug blend or inhalation grade lactose (vehicle control) was then added to the tap, the tap closed to prevent loss of drug, and the tap was re-weighed to determine the weight of drug in the tap. After dosing, the tap was weighed again to determine the weight of drug that had left the tap. The needle, a Sigma Z21934-7 syringe needle 19-gauge 152 mm (6 inches) long with luer hub, was cut by engineering to approximately 132 mm (5.2 inches), a blunt end was made to prevent them damaging the rat's trachea, and the needle weighed prior to and after drug delivery to confirm that no drug was retained in the needles after dosing.

Device for wet suspension administration: This is similar to the above but a blunt dosing needle, whose forward end was slightly angled to the needle axis, was used, with a flexible plastic portex canula inserted into the needle.

Drugs and Materials: Lipopolysaccharide (LPS) (Serotype:0127:B8) (L3129 Lot 61K4075) was dissolved in phosphate-buffered saline (PBS). PDE4 inhibitors are used in size-reduced (e.g. micronised) form, for example according to the Micronisation Example given above. For dry powder administration of the drug, the Dry Powder Formulation Example given above, comprising drug and inhalation-grade lactose, can be used. The inhalation-grade lactose usually used (Lot E98L4675 Batch 845120) has 10% fines (10% of material under 15µm particle size measured by Malvern particle size).

Wet suspensions of the drug can be prepared by adding the required volume of vehicle to the drug; the vehicle used being a mixture of saline/tween (0.2% tween 80). The wet suspension was sonicated for 10 minutes prior to use.

Preparation, and dosing with PDE 4 inhibitor: Rats were anaesthetised by placing the animals in a sealed Perspex chamber and exposing them to a gaseous mixture of isoflourane (4.5 %), nitrous oxide (3 litres.minute⁻¹) and oxygen (1 litre.minute⁻¹). Once anaesthetised, the animals were placed onto a stainless steel i.t. dosing support table. They were positioned on their back at approximately a 35° angle. A light was angled against the outside of the throat to highlight the trachea. The mouth was opened and the opening of the upper airway visualised. The procedure varies for wet suspension and dry powder administration of PDE4 inhibitors as follows:

Dosing with a Wet suspension: A portex cannula was introduced via a blunt metal dosing needle that had been carefully inserted into the rat trachea. The animals were intratracheally dosed with vehicle or PDE4 inhibitor via the dosing needle with a new internal canula used for each different drug group. The formulation was slowly (10 seconds) dosed into the trachea using a syringe attached to the dosing needle.

Dosing with a Dry Powder: The three-way tap device and needle were inserted into the rat trachea up to a pre-determined point established to be located approximately 1 cm above the primary bifurcation. Another operator holds the needle at the specified position whilst 2x 4ml of air is delivered through the three-way tap by depressing the syringes (ideally coinciding with the animal inspiring), aiming to expel the entire drug quantity from the tap. After dosing, the needle and tap are removed from the airway and the tap closed off to prevent any retained drug leaving the tap.

After dosing with either wet suspension or dry powder, the animals are then removed from the table and observed constantly until they have recovered from the effects of anaesthesia. The animals are returned to the holding cages and given free access to food and water; they are observed and any unusual behavioural changes noted.

Exposure to LPS: About 2 hours after i.t. dosing with vehicle control or the PDE4 inhibitor, the rats were placed into sealed Perspex containers and exposed to an aerosol of LPS (nebuliser concentration 150 µg.ml⁻¹) for 15 minutes. Aerosols of LPS were generated by a nebuliser (DeVilbiss, USA) and this was directed into the Perspex exposure chamber. Following the 15-minute LPS-exposure period, the animals were returned to the holding cages and allowed free access to both food and water.

[In an alternative embodiment, the rats can exposed to LPS less than 2 hours after i.t. dosing. In another alternative embodiment, the rats can exposed to LPS more than 2

hours (e.g. ca. 4 or ca. 6 hours) after i.t. dosing by vehicle or PDE4 inhibitor, to test whether or not the PDE4 inhibitor has a long duration of action (which is not essential).]

5 *Bronchoalveolar lavage:* 4 hours after LPS exposure the animals were killed by overdose of sodium pentobarbitone (i.p.). The trachea was cannulated with polypropylene tubing and the lungs lavaged (washed out) with 3 x 5 mls of heparinised (25 units.ml⁻¹) phosphate buffered saline (PBS).

10 *Neutrophil cell counts:* The Bronchoalveolar lavage (BAL) samples were centrifuged at 1300 rpm for 7 minutes. The supernatant was removed and the resulting cell pellet resuspended in 1 ml PBS. A cell slide of the resuspension fluid was prepared by placing 100µl of resuspended BAL fluid into cytospin holders and then spun at 5000 rpm for 5 minutes. The slides were allowed to air dry and then stained with Leishmans stain (20 minutes) to allow differential cell counting. The total cells were also counted from the resuspension. From these two counts, the total numbers of neutrophils in the BAL were determined. For a measure of PDE4-inhibitor-induced inhibition of
15 neutrophilia, a comparison of the neutrophil count in rats treated with vehicle and rats treated with PDE4 inhibitors is conducted.

20 By varying the dose of the PDE4 inhibitor used in the dosing step (e.g. 0.2 or 0.1 mg of PDE4 inhibitor per kg of body weight, down to e.g. 0.01 mg/kg), a dose-response curve can be generated.

25 All publications, including but not limited to patents and patent applications, cited in this specification are herein incorporated by reference as if each individual publication were specifically and individually indicated to be incorporated by reference herein as though fully set forth.

EXAMPLES

The various aspects of the invention will now be described by reference to the following examples. These examples are merely illustrative and are not to be construed as a
5 limitation of the scope of the present invention. In this section, "Intermediates" represent syntheses of intermediate compounds intended for use in the synthesis of the "Examples".

Abbreviations used herein:

10	DCM	dichloromethane
	EtOAc	ethyl acetate
	Et ₂ O	diethyl ether
	DMF	dimethyl formamide
15	MeOH	methanol
	HPLC	high pressure liquid chromatography
	SPE	solid phase extraction
	NMR	nuclear magnetic resonance (in which: s = singlet, d = doublet, t = triplet, q = quartet, dd = doublet of doublets, m = multiplet, H = no. of protons)
20	LCMS	liquid chromatography/mass spectroscopy
	TLC	thin layer chromatography
	BEMP	2-t-butylimino-2-diethylamino-1,3-dimethylperhydro-1,3,2-diazaphosphazine
	EDC	1-(3-Dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride
25	HATU	O-(7-Azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate
	HBTU	O-(Benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluorophosphate
	HOBT	hydroxybenzotriazole
	h	hours
30	DIPEA	diisopropylethyl amine (ⁱ Pr ₂ NEt)
	T _{RET}	retention time
	THF	Tetrahydrofuran
	Lawesson's reagent	2,4-bis(4-methoxyphenyl)-1,3-dithia-2,4-diphosphetane-2,4-disulphide
35	Room temperature	this is usually in the range of about 20 to about 25 °C.

Machine Methods used herein:*LCMS (liquid chromatography/mass spectroscopy)*

- 40 Waters ZQ mass spectrometer operating in positive ion electrospray mode, mass range 100-1000 amu.
UV wavelength : 215-330nm
Column : 3.3cm x 4.6mm ID, 3µm ABZ+PLUS

Flow Rate : 3ml/min

Injection Volume : 5µl

Solvent A : 95% acetonitrile + 0.05% formic acid

Solvent B : 0.1% formic acid + 10mMolar ammonium acetate

5 Gradient : 0% A/0.7min, 0-100% A/3.5min, 100% A/1.1min, 100-0% A/0.2min

Mass directed autoprep HPLC

The prep column used was a Supelcosil ABZplus (10cm x 2.12cm)
(usually 10cm x 2.12cm x 5 µm).

10 UV wavelength : 200-320nm

Flow : 20ml/min

Injection Volume: 1ml; or more preferably 0.5 ml

Solvent A : 0.1% formic acid

15 Solvent B : 95% acetonitrile + 5% formic acid; or more usually 99.95% acetonitrile +
0.05% formic acid

Gradient : 100% A/1min, 100-80% A/9min, 80-1% A/3.5min, 1% A/1.4min, 1-
100% A/0.1min

Intermediates and Examples

20

All reagents not detailed in the text below are commercially available from established suppliers such as Sigma-Aldrich. The addresses of the suppliers for some of the starting materials mentioned in the Intermediates and Examples below are as follows:

25

- ABCR GmbH & CO. KG, P.O. Box 21 01 35, 76151 Karlsruhe, Germany

- Aceto Color Intermediates (catalogue name), Aceto Corporation, One Hollow Lane, Lake Success, NY, 11042-1215, USA

- Acros Organics, A Division of Fisher Scientific Company, 500 American Road, Morris Plains, NJ 07950, USA

30

- Apin Chemicals Ltd., 82 C Milton Park, Abingdon, Oxon OX14 4RY, United Kingdom

- Apollo Scientific Ltd., Unit 1A, Bingswood Industrial Estate, Whaley Bridge, Derbyshire SK23 7LY, United Kingdom

- Aldrich (catalogue name), Sigma-Aldrich Company Ltd., Dorset, United Kingdom, telephone: +44 1202 733114; Fax: +44 1202 715460; ukcustsv@eurnotes.sial.com; or

35

- Aldrich (catalogue name), Sigma-Aldrich Corp., P.O. Box 14508, St. Louis, MO 63178-9916, USA; telephone: 314-771-5765; fax: 314-771-5757; custserv@sial.com; or

- Aldrich (catalogue name), Sigma-Aldrich Chemie GmbH, Munich, Germany; telephone: +49 89 6513 0; Fax: +49 89 6513 1169; deorders@eurnotes.sial.com.

- Alfa Aesar, A Johnson Matthey Company, 30 Bond Street, Ward Hill, MA 01835-8099, USA

40

- Array Biopharma Inc., 1885 33rd Street, Boulder, CO 80301, USA

- AstaTech, Inc., 8301 Torresdale Ave., 19C, Philadelphia, PA 19136, USA

- Austin Chemical Company, Inc., 1565 Barclay Blvd., Buffalo Grove, IL 60089, USA

- Avocado Research, Shore Road, Port of Heysham Industrial Park, Heysham

Lancashire LA3 2XY, United Kingdom

- Bayer AG, Business Group Basic and Fine Chemicals, D-51368 Leverkusen, Germany
- Berk Univar plc, Berk House, P.O.Box 56, Basing View, Basingstoke, Hants RG21 2E6, United Kingdom

- 5 - Butt Park Ltd., Braysdown Works, Peasedown St. John, Bath BA2 8LL, United Kingdom
- Chemical Building Blocks (catalogue name), Ambinter, 46 quai Louis Bleriot, Paris, F-75016, France
- ChemBridge Europe, 4 Clark's Hill Rise, Hampton Wood, Evesham, Worcestershire WR11 6FW, United Kingdom
- 10 - ChemService Inc., P.O.Box 3108, West Chester, PA 19381, USA
- Combi-Blocks Inc., 7949 Silverton Avenue, Suite 915, San Diego, CA 92126, USA
- Dynamit Nobel GmbH, Germany; also available from: Saville Whittle Ltd (UK agents of Dynamit Nobel), Vickers Street, Manchester M40 8EF, United Kingdom
- E. Merck, Germany; or E. Merck (Merck Ltd), Hunter Boulevard,
- 15 Magna Park, Lutterworth, Leicestershire LE17 4XN, United Kingdom
- Esprit Chemical Company, Esprit Plaza, 7680 Matoaka Road, Sarasota, FL 34243, USA
- Exploratory Library (catalogue name), Ambinter, 46 quai Louis Bleriot, Paris, F-75016, France
- Fluka Chemie AG, Industriestrasse 25, P.O. Box 260, CH-9471 Buchs, Switzerland
- Fluorochem Ltd., Wesley Street, Old Glossop, Derbyshire SK13 7RY, United Kingdom
- 20 - ICN Biomedicals, Inc., 3300 Hyland Avenue, Costa Mesa, CA 92626, USA
- Interchim Intermediates (catalogue name), Interchim, 213 Avenue Kennedy, BP 1140, Montlucon, Cedex, 03103, France
- Key Organics Ltd., 3, Highfield Industrial Estate, Camelford, Cornwall PL32 9QZ, United Kingdom
- 25 - Lancaster Synthesis Ltd., Newgate, White Lund, Morecambe, Lancashire LA3 3DY, United Kingdom
- Manchester Organics Ltd., Unit 2, Ashville Industrial Estate, Sutton Weaver, Runcorn, Cheshire WA7 3PF, United Kingdom
- Matrix Scientific, P.O. Box 25067, Columbia, SC 29224-5067, USA
- 30 - Maybridge Chemical Company Ltd., Trevillet, Tintagel, Cornwall PL34 0HW, United Kingdom
- Maybridge Reactive Intermediates (catalogue name), Maybridge Chemical Company Ltd., Trevillet, Tintagel, Cornwall PL34 0HW, United Kingdom
- MicroChemistry Building Blocks (catalogue name), MicroChemistry-RadaPharma, Shosse
- 35 Entusiastov 56, Moscow, 111123, Russia
- Miteni S.p.A., Via Mecenate 90, Milano, 20138, Italy
- N.D. Zelinsky Institute, Organic Chemistry, Leninsky prospect 47, 117913 Moscow B-334, Russia
- Optimer Building Block (catalogue name), Array BioPharma, 3200 Walnut Street, Boulder,
- 40 CO 80301, USA
- Peakdale Molecular Ltd., Peakdale Science Park, Sheffield Road, Chapel-en-le-Frith, High Peak SK23 0PG, United Kingdom
- Pfaltz & Bauer, Inc., 172 East Aurora Street, Waterbury, CT 06708, USA

- Rare Chemicals (catalogue name), Rare Chemicals GmbH, Schulstrasse 6, 24214 Gettorf, Germany
- SALOR (catalogue name) (Sigma Aldrich Library of Rare Chemicals), Aldrich Chemical Company Inc, 1001 West Saint Paul Avenue, Milwaukee, WI 53233, USA
- 5 - Sigma (catalogue name), Sigma-Aldrich Corp., P.O. Box 14508, St. Louis, MO 63178-9916, USA; see "Aldrich" above for other non-US addresses and other contact details
- SIGMA-RBI, One Strathmore Road, Natick, MA 01760-1312, USA
- Synchem OHG Heinrich-Plett-Strasse 40, Kassel, D-34132, Germany
- Syngene International Pvt Ltd, Hebbagodi, Hosur Road, Bangalore, India.
- 10 - TCI America, 9211 North Harborside Street, Portland, OR 97203, USA
- TimTec Building Blocks A, TimTec, Inc., P O Box 8941, Newark, DE 19714-8941, USA
- Trans World Chemicals, Inc., 14674 Southlawn Lane, Rockville, MD 20850, USA
- Ubichem PLC, Mayflower Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO53 4AR, United Kingdom
- 15 - Ultrafine (UFC Ltd.), Synergy House, Guildhall Close, Manchester Science Park, Manchester M15 6SY, United Kingdom

Table of Intermediates

20

Inter- mediate Number	Name
1	Ethyl 4-chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
2	Ethyl 4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
3	Ethyl 1-methyl-4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
4	Ethyl 1-benzyl-4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
5	Ethyl 4-chloro-1-phenyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
6	1-Acetyl-4-aminopiperidine
7	1-Methyl-4-aminopiperidine
8	4-Aminotetrahydropyran
8A	Tetrahydro-2H-pyran-4-amine hydrochloride = 4-Aminotetrahydropyran hydrochloride
9	(R)-(+)-3-Amino tetrahydrofuran 4-toluene sulphonate
10	(S)-(-)-3-Amino tetrahydrofuran 4-toluene sulphonate
11	Tetrahydro-2H-thiopyran-4-amine
12	Tetrahydro-3-thiopheneamine
13	Tetrahydro-3-thiopheneamine 1,1-dioxide hydrochloride
14	Tetrahydro-2H-thiopyran-4-amine-1,1-dioxide hydrochloride
15	4-Chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
16	4-Chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carbonyl chloride
17	N-Benzyl-4-chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

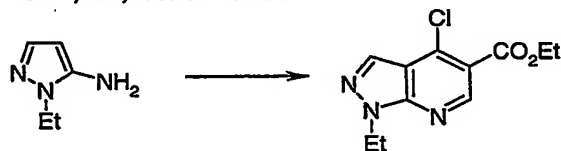
18	4-Chloro-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
19	4-Chloro-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
20	4-Chloro-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
21	4-Chloro-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridine
22	4-Chloro-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
23	4-Chloro-1-ethyl-N-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
24	4-Chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
25	Ethyl 4-chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
26	4-Chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
27	4-Chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carbonyl chloride
28	N-Benzyl-4-chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
29	4-Chloro-1-methyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
30	4-Chloro-1-methyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
31	4-Chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
32	Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
33	1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
34	Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
35	Ethyl 1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
36	Ethyl 1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
37	Ethyl 1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
38	Ethyl 4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
39	Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
40	Ethyl 4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
41	1-Ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
42	Ethyl 1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
43	1-Ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
44	1-Ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
45	4-(Cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid

46	4-[(1,1-Dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
47	4-[(1,1-Dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
48	Ethyl 4-(cyclohexylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
49	4-(Cyclohexylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
50	1-n-Propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
51	Ethyl 4-chloro-1-ethyl-6-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
52	4-(Cyclohexylamino)-1-ethyl-6-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
53	1-Ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid
54	4-Aminocyclohexanone hydrochloride

Intermediate 1: Ethyl 4-chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

Prepared from commercially available 5-amino-1-ethyl pyrazole as described by G. Yu et. al. in *J. Med Chem.*, 2001, 44, 1025-1027:

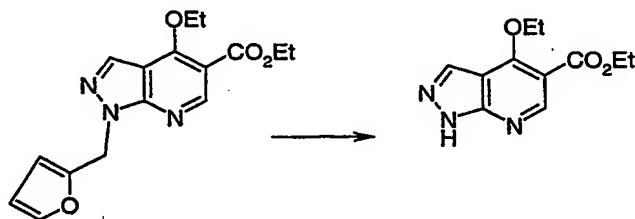
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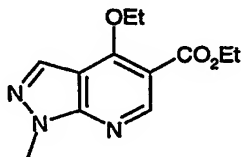
Intermediate 2: Ethyl 4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

Can be prepared by oxidative cleavage (SeO₂) of 1-furanylmethyl derivative, as described by T. M. Bare et. al. In *J. Med. Chem.*, 1989, 32, 2561-2573, (further referenced to Zuleski, F. R., Kirkland, K. R., Melgar, M. D.; Malbica, *J. Drug. Metab. Dispos.*, 1985, 13, 139)

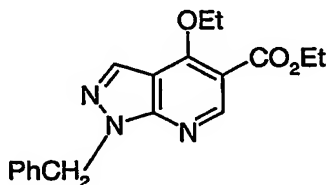
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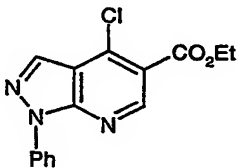
15

Intermediate 3: Ethyl 1-methyl-4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

- 5 A mixture of Intermediate 2 (0.47g) and anhydrous potassium carbonate (0.83g) (previously dried by heating at 100°C) in anhydrous dimethylformamide (DMF) (4ml) was treated with iodomethane (0.26ml) and stirred vigorously for 3h. The mixture was then filtered and the filtrate concentrated in vacuo to afford a residual oil, which was partitioned between dichloromethane (DCM) (25ml) and water (25ml). The layers were separated and the aqueous phase was extracted with further DCM (2x25ml). The combined organic extracts were dried over anhydrous sodium sulphate and evaporated to an orange solid which was applied to an SPE cartridge (silica, 20g). The cartridge was eluted sequentially with EtOAc : petrol (1:4, 1:2 and 1:1), then chloroform : methanol (49:1, 19:1 and 9:1). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 3 (0.165g). LCMS showed $MH^+ = 250$; $T_{RET} = 2.59$ min.

Intermediate 4: Ethyl 1-benzyl-4-ethoxy-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

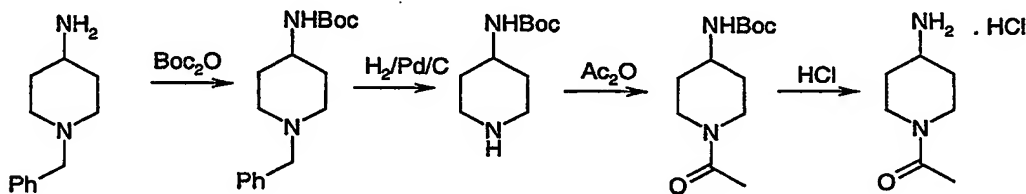
- 20 A mixture of Intermediate 2 (0.47g) and anhydrous potassium carbonate (0.83g) (previously dried by heating at 100°C) in anhydrous DMF (4ml) was treated with benzyl bromide (0.72g) then stirred vigorously and heated at 55°C for 4.5h. The mixture was allowed to cool, then filtered and the filtrate concentrated in vacuo to afford a residual oil, which was partitioned between DCM (25ml) and water (25ml). The layers were separated and the aqueous phase was extracted with further DCM (2x25ml). The combined organic extracts were dried over anhydrous sodium sulphate and evaporated to a yellow oily solid which was dissolved in DCM and applied to an SPE cartridge (silica, 20g). The cartridge was eluted with a gradient of EtOAc : petrol (1:4, 1:2 and 1:1) then chloroform : methanol (49:1, 19:1 and 9:1). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 4 (0.33g). LCMS showed $MH^+ = 326$; $T_{RET} = 3.24$ min.

Intermediate 5: Ethyl 4-chloro-1-phenyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

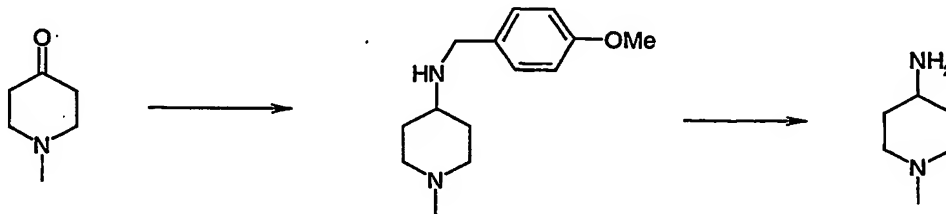
- 5 A mixture of 5-amino-1-phenyl pyrazole (2.0g) and diethylethoxymethylene malonate (2.54ml) was heated under Dean Stark conditions at 120°C for 16h. The solution was cooled, phosphorus oxychloride (16ml) was then added and the mixture heated under reflux for a further 20h. Excess phosphorus oxychloride was removed in vacuo and the residue partitioned between diethyl ether and water, proceeding with extreme caution on
- 10 addition of water. The ethereal layer was washed with further water, then dried over magnesium sulphate and concentrated in vacuo to afford ethyl 4-chloro-1-phenyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate (2.09g). LCMS showed $MH^+ = 302$; $T_{RET} = 3.80$ min.

Intermediate 6: 1-Acetyl-4-aminopiperidine

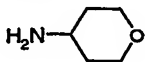
Prepared from commercially available N1-benzyl-4-aminopiperidine as described by Yamada *et. al.* In WO 00/42011:

**Intermediate 7: 1-Methyl-4-aminopiperidine**

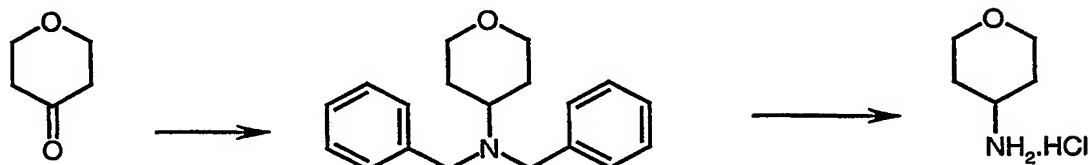
Prepared from commercially available N-methyl-4-piperidone as described by C. M. Andersson *et. al.* in WO01/66521:

**Intermediate 8: 4-Aminotetrahydropyran**

Commercially available from Combi-Blocks Inc., 7949 Silverton Avenue, Suite 915, San Diego, CA 92126, USA (CAS 38041-19-9)



Intermediate 8A: Tetrahydro-2H-pyran-4-amine hydrochloride = 4-Aminotetrahydropyran hydrochloride



Step 1: N,N-dibenzyltetrahydro-2H-pyran-4-amine

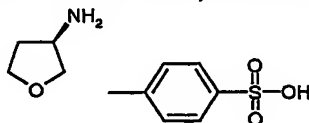
Dibenzylamine (34.5g) and acetic acid (6.7ml) were added to a stirred solution of tetrahydro-4H-pyran-4-one (16.4g, commercially available from e.g. Aldrich) in dichloromethane (260ml) at 0 °C to 5 °C. After 2.5h at 0 °C to 5 °C, sodium triacetoxyborohydride (38.9g) was added portionwise, and the mixture was allowed to warm to room temperature. After stirring at room temperature overnight, the reaction mixture was washed successively with 2M-sodium hydroxide (200ml and 50ml), water (2 x 50ml) and brine (50ml), then dried and evaporated to give a yellow oil (45g). This oil was stirred with methanol (50ml) at 4 °C for 30min to give the product as a white solid (21.5g). LCMS showed MH^+ = 282; T_{RET} = 1.98 min.

Step 2: Tetrahydro-2H-pyran-4-amine hydrochloride

N,N-dibenzyltetrahydro-2H-pyran-4-amine (20.5g) was dissolved in ethanol (210ml) and hydrogenated over 10% palladium on carbon catalyst (4g) at 100 psi for 72h at room temperature. The reaction mixture was filtered and the filtrate was adjusted to pH 1 with 2M-hydrogen chloride in diethyl ether. Evaporation of solvents gave a solid which was triturated with diethyl ether to give the product as a white solid (9.23g). ¹H NMR (400MHz in d₆-DMSO, 27°C, δppm) 8.24 (br. s, 3H), 3.86 (dd, 12, 4Hz, 2H), 3.31 (dt, 2, 12Hz, 2H), 3.20 (m, 1H), 1.84 (m, 2H), 1.55 (dq, 4, 12Hz, 2H).

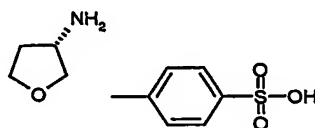
Intermediate 9: (R)-(+)-3-Amino tetrahydrofuran 4-toluenesulphonate

Commercially available from Fluka Chemie AG, Germany (CAS 111769-27-8)



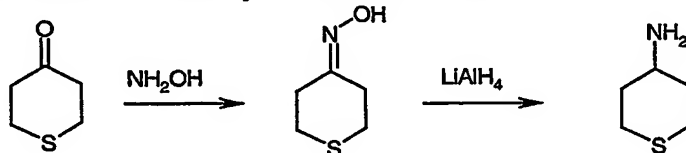
Intermediate 10: (S)-(-)-3-Amino tetrahydrofuran 4-toluenesulphonate

Commercially available from E. Merck, Germany; or from E. Merck (Merck Ltd), Hunter Boulevard, Magna Park, Lutterworth, Leicestershire LE17 4XN, United Kingdom (CAS 104530-80-5)

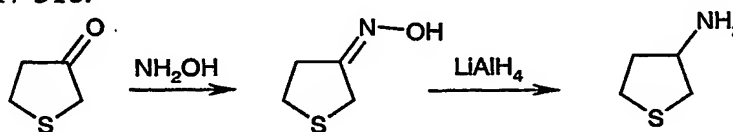


Intermediate 11: Tetrahydro-2H-thiopyran-4-amine

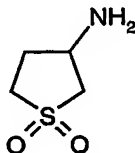
Prepared from commercially available tetrahydrothiopyran-4-one as described by Subramanian et. al., *J. Org. Chem.*, 1981, 46, 4376-4383. Subsequent preparation of the hydrochloride salt can be achieved by conventional means.

**Intermediate 12: Tetrahydro-3-thiopheneamine**

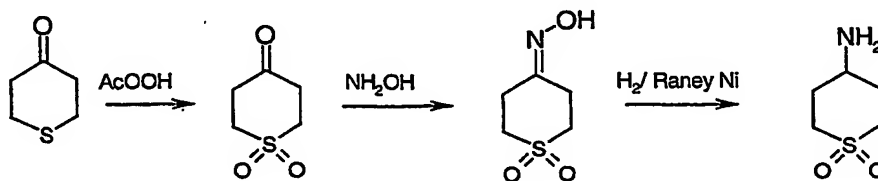
Prepared in an analogous manner to Intermediate 11 from commercially available tetrahydrothiophene-4-one. The oxime formation is described by Grigg et.al., *Tetrahedron*, 1991, 47, 4477-4494 and the oxime reduction by Unterhalt et. al., *Arch. Pharm.*, 1990, 317-318.

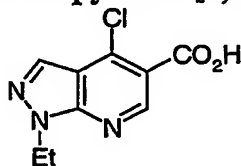
**Intermediate 13: Tetrahydro-3-thiopheneamine 1,1-dioxide hydrochloride**

Commercially available from Sigma Aldrich Library of Rare Chemicals (SALOR) (CAS-6338-70-1). Preparation of the hydrochloride salt of the amine can be achieved by conventional means.

**Intermediate 14: Tetrahydro-2H-thiopyran-4-amine-1,1-dioxide hydrochloride**

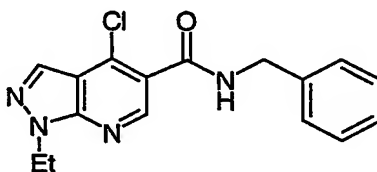
Prepared in an analogous manner to Intermediate 11 from commercially available tetrahydrothiophene-4-one. Oxidation to 1,1-dioxo-tetrahydro-1 λ^6 -thiopyran-4-one is described by Rule et. al., in *J. Org. Chem.*, 1995, 60, 1665-1673. Oxime formation is described by Truce et.al., in *J. Org. Chem.*, 1957, 617, 620 and oxime reduction by Barkenbus et. al., *J. Am. Chem. Soc.*, 1955, 77, 3866. Subsequent preparation of the hydrochloride salt of the amine can be achieved by conventional means.



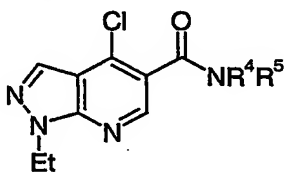
Intermediate 15: 4-Chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid

A solution of Intermediate 1 (3.5g) in dioxane (28ml) was treated with potassium hydroxide (6.3g) as a solution in water (20ml). The mixture was stirred for 2h, then concentrated in vacuo, acidified to pH 3 with 2M aqueous hydrochloric acid and extracted with ethyl acetate. The layers were separated, the organic layer dried over sodium sulphate, then concentrated in vacuo to afford Intermediate 15 as a white solid (2.4g). LCMS showed $MH^+ = 226$; $T_{RET} = 2.62\text{min}$.

10 **Intermediate 17: N-Benzyl-4-chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide**



That is, Intermediate 17 is:

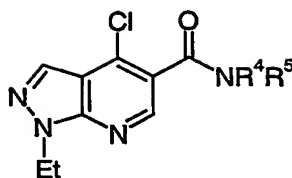


wherein $NR^4R^5 =$

15 Intermediate 15 (3.5g) was dried over phosphorus pentoxide for 1h, then treated with thionyl chloride (47g). The mixture was stirred and heated at 75°C for 1.3h. Excess thionyl chloride was removed in vacuo and the residual oil azeotroped with dichloromethane (DCM) to afford **Intermediate 16**, presumed to be the acid chloride derivative of Intermediate 15, as a white solid (3.3g).

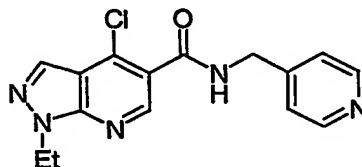
20 Intermediate 16 (0.473g) was dissolved in tetrahydrofuran (THF) (4ml) and treated with N,N-diisopropylethylamine (DIPEA) (0.509ml), then with benzylamine (0.209g) and the mixture stirred under nitrogen for 0.5h. The mixture was concentrated in vacuo, then partitioned between dichloromethane and water. The layers were separated and the organics concentrated in vacuo to afford **Intermediate 17** (0.574g). LCMS showed MH^+
25 $= 315$; $T_{RET} = 2.90\text{min}$.

Similarly prepared were the following:



	NR ⁴ R ⁵	Amine reagent	MH ⁺ ion	T _{RET} (min)
Intermediate 18		2-Ethyl-N-butylamine	309	3.07
Intermediate 19		4-Fluoroaniline	319	3.08
Intermediate 20		Cyclopentylamine	293	2.76
Intermediate 21		Pyrrolidine	279	2.46

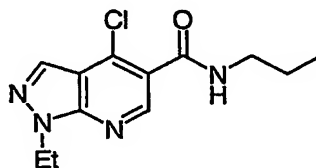
Intermediate 22: 4-Chloro-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



5

Acid chloride Intermediate 16 was synthesised from Intermediate 15 using the method shown above for Intermediate 17. Intermediate 16 (0.473g) was dissolved in THF (4ml) and treated with diisopropylethylamine (DIPEA) (0.509ml), then with 4-(aminomethyl)pyridine (0.211g) and the mixture stirred under nitrogen for 0.5h. The mixture was concentrated in vacuo, then partitioned between DCM and water. The layers were separated and the organics concentrated in vacuo, then applied to an SPE cartridge (silica, 10g) which was eluted with a gradient of cyclohexane : EtOAc (2:1 increasing stepwise up to 0:1), followed by MeOH : EtOAc (5:95, then 10:90). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 22 (0.086g). LCMS showed MH⁺ = 316; T_{RET} = 1.84min.

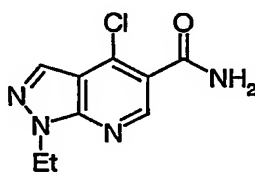
Intermediate 23: 4-Chloro-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



20

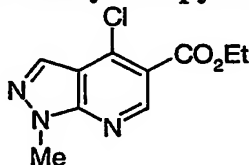
Acid chloride Intermediate 16 was synthesised from Intermediate 15 using the method shown above for Intermediate 17. Intermediate 16 (0.473g) was dissolved in THF (4ml) and treated with DIPEA (0.509ml), then with n-propyl amine (0.115g) and the mixture stirred under nitrogen for 0.5h. A further portion of n-propyl amine (0.023g) was then added and stirring continued for 18h. The mixture was concentrated in vacuo, then partitioned between DCM and water. The layers were separated and the organics concentrated in vacuo to afford Intermediate 23 (0.405g). LCMS showed $MH^+ = 267$; $T_{RET} = 2.54\text{min}$.

10 **Intermediate 24: 4-Chloro-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide**



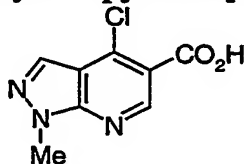
15 Acid chloride Intermediate 16 was synthesised from Intermediate 15 using the method shown above for Intermediate 17. Intermediate 16 (0.30g) was dissolved in THF (3ml) and treated with a 0.5M solution of ammonia in dioxane (4.92ml). The mixture was stirred under nitrogen for 18h. A further portion of 0.5M ammonia in dioxane (4.92ml) was added and stirring continued for 72h. The mixture was concentrated in vacuo and the residue partitioned between DCM and 2M sodium hydroxide solution. The layers were separated and the organics concentrated to afford Intermediate 24 (0.278g). LCMS showed $MH^+ = 225$; $T_{RET} = 2.10\text{min}$.

20 **Intermediate 25: Ethyl 4-chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate**



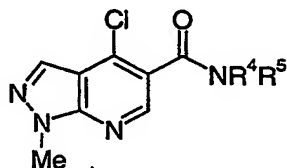
25 A mixture of 5-amino-1-methyl pyrazole (4.0g) and diethylethoxymethylene malonate (9.16ml) was heated at 150°C under Dean Stark conditions for 5h. Phosphorous oxychloride (55ml) was carefully added to the mixture and the resulting solution heated at 130°C under reflux for 18h. The mixture was concentrated in vacuo, then the residual oil cooled in an ice bath and treated carefully with water (100ml)(caution: exotherm). The resulting mixture was extracted with DCM (3x100ml) and the combined organic extracts were dried over anhydrous sodium sulphate and concentrated in vacuo. The residual solid was purified by Biotage chromatography (silica, 90g), eluting with Et2O : petrol (1:3). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 25 (4.82g). LCMS showed $MH^+ = 240$; $T_{RET} = 2.98\text{min}$

35

Intermediate 26: 4-Chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid

5 A solution of Intermediate 25 (4.0g) in dioxane (30ml) was treated with potassium hydroxide (7.54g) as a solution in water (20ml). The mixture was stirred for 16h, then diluted with water (150ml) and acidified to pH 3 with 5M aqueous hydrochloric acid. The mixture was stirred in an ice bath for 15min, then collected by filtration, washed with ice-cold water and dried in vacuo over phosphorous pentoxide to afford Intermediate 26 as a white solid (2.83g). LCMS showed $MH^+ = 212$; $T_{RET} = 2.26$ min.

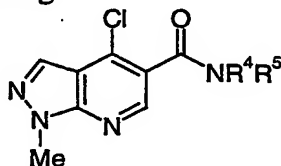
10 **Intermediate 28: N-Benzyl-4-chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide**



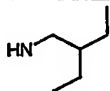
15 Intermediate 26 (2.5g) (previously dried over phosphorus pentoxide) was treated with thionyl chloride (25ml) and the mixture heated under reflux for 1h. Excess thionyl chloride was removed in vacuo to afford **Intermediate 27**, presumed to be the acid chloride derivative of Intermediate 26, as a white solid (2.7g).

20 Intermediate 27 (0.68g) was dissolved in THF (10ml) and treated with DIPEA (0.77ml), then with benzyl amine (0.339g) and the mixture stirred under nitrogen for 3h. The mixture was concentrated in vacuo, then partitioned between DCM (20ml) and water (10ml). The layers were separated and the organics concentrated in vacuo to afford **Intermediate 28** (0.90g). LCMS showed $MH^+ = 301$; $T_{RET} = 2.72$ min.

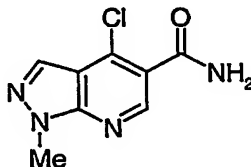
25 Similarly prepared were the following:



	NR^4R^5	Amine reagent	MH^+ ion	T_{RET} (min)
Intermediate 29		4-Fluoroaniline	305	2.91

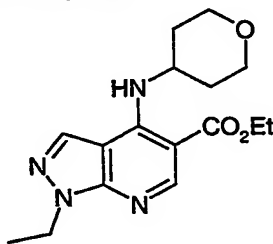
Intermediate 30		2-Ethyl-N-butylamine	295	2.97
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Intermediate 31: 4-Chloro-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



- 5 Acid chloride Intermediate 27 was synthesised from Intermediate 26 using the method shown above for Intermediate 28. Intermediate 27 (0.68g) was then treated with a 0.5M solution of ammonia in dioxane (17.7ml). Diisopropylethylamine (0.51ml) was then added and the mixture stirred for 21h. The mixture was then partitioned between DCM (100ml) and water (30ml). An insoluble solid was removed by filtration, washed with
- 10 water (20ml) and dried in vacuo over phosphorous pentoxide to afford Intermediate 31 (0.544g). LCMS showed $MH^+ = 211$; $T_{RET} = 1.84min$.

Intermediate 32 (= Example 3): Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

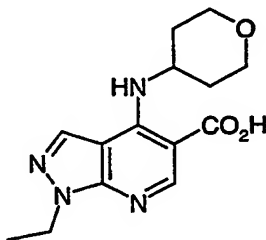


15

- Intermediate 1 (0.20g) and triethylamine (0.55ml) were suspended in ethanol (8ml) and 4-aminotetrahydropyran (0.088g) was added. The mixture was stirred under nitrogen, heated at 80°C for 16h, then concentrated in vacuo. The residue was partitioned between
- 20 DCM and water. The layers were separated and the organic layer was loaded directly onto an SPE cartridge (silica, 5g) which was eluted sequentially with; (i) DCM, (ii) DCM : Et₂O (2:1), (iii) DCM : Et₂O (1:1), (iv) Et₂O and (v) EtOAc. Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 32 (0.21g). LCMS showed $MH^+ = 319$; $T_{RET} = 2.93min$.

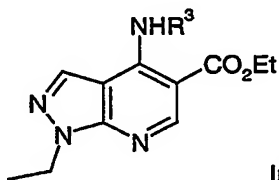
25

Intermediate 33: 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



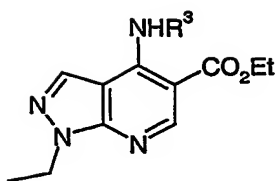
5 A solution of Intermediate 32 (0.21g) in ethanol : water (95:5, 10ml) was treated with sodium hydroxide (0.12g). The mixture was heated at 50°C for 8h, then concentrated in vacuo, dissolved in water and acidified to pH 4 with acetic acid. The resultant white solid was removed by filtration and dried under vacuum to afford Intermediate 33 as an off-white solid (0.156g). LCMS showed MH^+ = 291; T_{RET} = 2.11min.

10 **Intermediate 34 (= Example 8): Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate**



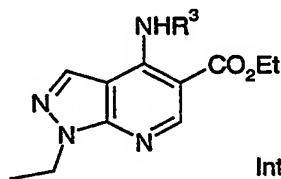
15 Intermediate 1 (0.05g) and (S)-(-)-3-aminotetrahydrofuran 4-toluenesulphonate (0.052g) were suspended in ethanol (1ml) and triethylamine (0.14ml) was added. The mixture was stirred under nitrogen and heated at 80°C for 24h. After cooling to room temperature, ethanol was removed by evaporation under a stream of nitrogen and the residue partitioned between DCM (2ml) and water (1.5ml). The layers were separated and the organic layer concentrated to dryness. Purification was carried out using an SPE cartridge
20 (silica, 5g), eluting with a gradient of EtOAc : cyclohexane; (1:16 then, 1:8, 1:4, 1:2, 1:1 and 1:0). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 34 (= Example 8) (0.052g). LCMS showed MH^+ = 305; T_{RET} = 2.70min.

25 Similarly prepared were the following:

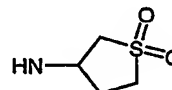


	NHR ³	Amine Reagent	MH ⁺ ion	T _{RET} (min)
Intermediate 35 (= Example 9)		(R)-(+)-3-Aminotetrahydrofuran 4-toluenesulphonate	305	2.73
Intermediate 36 (= Example 10)		Intermediate 11	335	3.21
Intermediate 37 (= Example 11)		Intermediate 12	321	3.10
Intermediate 38 (= Example 12)		Cyclopropylamine	275	2.98

Intermediate 39 (= Example 13): Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

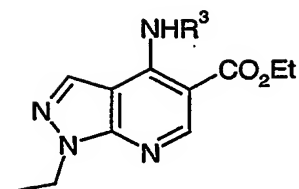


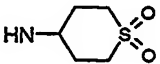
Intermediate 39 NHR³ =



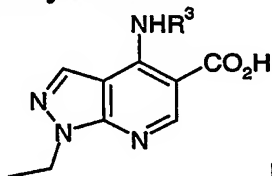
Intermediate 1 (0.05g) and Intermediate 13 (0.027g) were suspended in ethanol (1ml) and triethylamine (0.14ml) was added. The mixture was stirred under nitrogen and heated at 80°C for 24h. After cooling to room temperature, ethanol was removed by evaporation under a stream of nitrogen and the residue partitioned between DCM (2ml) and water (1.5ml). The layers were separated and the organic layer concentrated to dryness. Purification was carried out using an SPE cartridge (silica, 5g), eluting with a gradient of EtOAc : cyclohexane; (1:8 then 1:4, 1:2, 1:1 and 1:0). Fractions containing desired material were combined and concentrated in vacuo to afford Intermediate 39 (= Example 13) (0.045g) as a mixture of enantiomers. LCMS showed MH⁺ = 353; T_{RET} = 2.60min.

Similarly prepared was the following:



	NHR ³	Amine Reagent	MH ⁺ ion	T _{RET} (min)
Intermediate 40 (= Example 14)		Intermediate 14	367	2.64

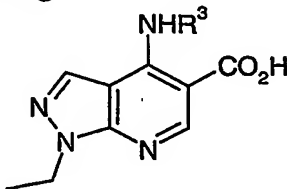
5 **Intermediate 41:** 1-Ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid


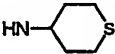




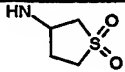
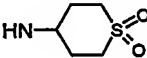
10 A solution of Intermediate 34 (0.037g) in ethanol : water (95:5, 3ml) was treated with sodium hydroxide (0.019g). The mixture was heated at 50°C for 16h, then concentrated in vacuo. The residue was dissolved in water (1.5ml) and acidified to pH 4 with acetic acid. The resultant white solid precipitate was removed by filtration and dried under vacuum. The filtrate was extracted with ethyl acetate and the organic layer collected and concentrated in vacuo to afford a further portion of white solid. The two solids were combined to afford Intermediate 41 (0.033g). LCMS showed MH⁺ = 277; T_{RET} = 2.05 min.

15

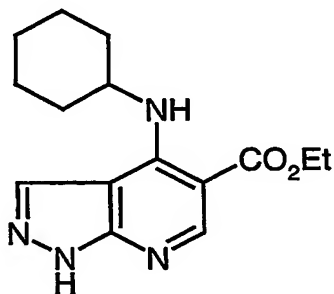
Similarly prepared were the following:



	NHR ³	Starting material	MH ⁺ ion	T _{RET} (min)
Intermediate 42		Intermediate 35	277	2.05
Intermediate 43		Intermediate 36	307	2.40

Intermediate 44		Intermediate 37	293	2.59
Intermediate 45		Intermediate 38	247	2.24
Intermediate 46		Intermediate 39	325	2.05
Intermediate 47		Intermediate 40	339	2.05

Intermediate 48: Ethyl 4-(cyclohexylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

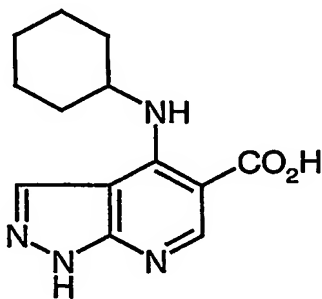


5

Intermediate 2 (0.69g) was suspended in cyclohexylamine (1.01ml), and the mixture was heated at 90 °C for 3h. The residual mixture was allowed to cool to room temperature and partitioned between chloroform (25ml) and water (25ml). The phases were separated and the organic phase was evaporated to dryness. The residue was triturated with Et₂O (25ml) and the insoluble solid was collected and dried to afford Intermediate 48 as a beige solid (0.58g). LCMS showed MH⁺=289; T_{RET} = 2.91min.

10

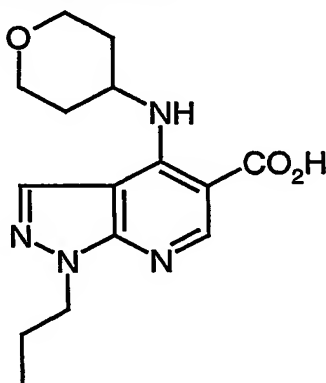
Intermediate 49: 4-(Cyclohexylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



15

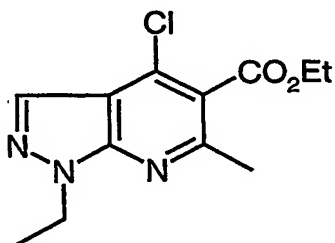
2M-Sodium hydroxide solution (0.5ml) was added to a stirred suspension of Intermediate 48 (0.2g) in dioxan (4ml) and water (0.5ml). After stirring overnight at room temperature, the reaction mixture was heated at 40 °C for 8h. A further quantity of 2M-sodium hydroxide solution (1.5ml) was added, and the reaction mixture was heated at 40 °C for 48h. The reaction solution was concentrated, diluted with water (10ml) and acidified with glacial acetic acid. The resulting precipitate was collected by filtration, washed with water and dried to give Intermediate 49 (0.18g). LCMS showed $MH^+ = 261$; $T_{RET} = 2.09min$.

10 **Intermediate 50:** 1-n-Propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



2M-Sodium hydroxide solution (0.7ml) was added to a stirred suspension of Example 185 (0.23g, described hereinafter) in ethanol (5ml) and water (1.5ml). After stirring overnight at room temperature, a further quantity of 2M-sodium hydroxide solution (0.7ml) was added, and the reaction mixture was heated at 43 °C for 2.5h. The reaction solution was concentrated, diluted with water (5ml) and acidified with 2M-hydrochloric acid. The resulting precipitate was collected by filtration, washed with water and dried to give Intermediate 50 as a white solid (0.14g). LCMS showed $MH^+ = 305$; $T_{RET} = 2.42min$.

Intermediate 51: Ethyl 4-chloro-1-ethyl-6-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

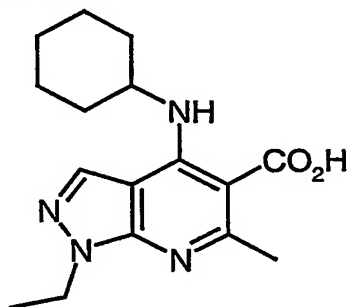


25 A mixture of 5-amino-1-ethylpyrazole (1.614g, 14.5mmol) and diethyl 2-(1-ethoxyethylidene)malonate (3.68g, 16.0mmol, as described by P.P.T. Sah, *J. Amer. Chem. Soc.*, 1931, 53, 1836) was heated at 150 °C under Dean Stark conditions for 5 hours. Phosphorous oxychloride (25ml) was carefully added to the mixture and the

resulting solution was heated at 130 °C under reflux for 18 hours. The mixture was concentrated *in vacuo*, then the residual oil was carefully added, with cooling, to water (100ml). The resulting mixture was extracted with DCM (3x100ml) and the combined organic extracts were dried over anhydrous sodium sulphate and concentrated *in vacuo*.

- 5 The residual oil was purified by Biotage chromatography (silica, 90g) eluting with ethyl acetate-petrol (1:19). Fractions containing the desired product were combined and concentrated *in vacuo* to afford Intermediate 51 (1.15g). LCMS showed $MH^+ = 268$; $T_{RET} = 3.18\text{min}$.

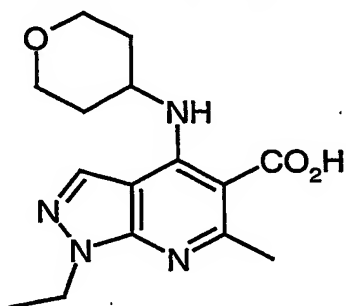
10 **Intermediate 52:** 4-(Cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid



- 2M-Sodium hydroxide solution (0.39ml, 0.78mmol) was added to Example 190 (0.128g, 0.39mmol, described hereinafter) in ethanol (1.5ml), and the mixture was heated at 50 °C for 16 hours. The reaction mixture was concentrated, and the resulting aqueous solution was neutralised with 2M-hydrochloric acid to precipitate a solid which was collected by filtration. The filtrate was applied to an OASIS[®] hydrophilic-lipophilic balance (HLB) Extraction cartridge * (1g) which was eluted with water followed by methanol. Evaporation of the methanol fraction gave a solid which was combined with the initial precipitated solid to afford Intermediate 52 (0.083g) as a white solid, presumed to be the carboxylic acid.
- 15
- 20

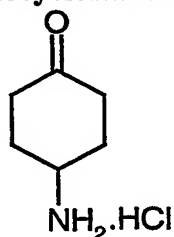
- * OASIS[®] HLB Extraction cartridges are available from Waters Corporation, 34 Maple Street, Milford, MA 01757, USA. The cartridges include a column containing a copolymer sorbent having a HLB such that when an aqueous solution is eluted through the column, the solute is absorbed or adsorbed into or onto the sorbent, and such that when organic solvent (e.g. methanol) is eluted the solute is released as an organic (e.g. methanol) solution. This is a way to separate the solute from aqueous solvent.
- 25

Intermediate 53: 1-Ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



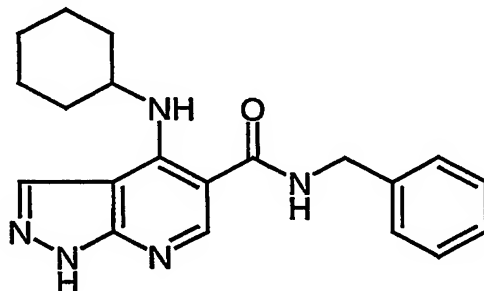
2M-Sodium hydroxide solution (0.75ml, 1.5mmol) was added to Example 189 (0.248g, 0.75mmol, described hereinafter) in ethanol (2ml), and the mixture was heated at reflux for 16 hours. The reaction mixture was concentrated, diluted with water (1ml) and acidified with 2M-hydrochloric acid (0.75ml) to precipitate a solid which was collected by filtration to afford Intermediate 53 (0.168g). LCMS showed $MH^+ = 305$; $T_{RET} = 1.86min$.

Intermediate 54: 4-Aminocyclohexanone hydrochloride



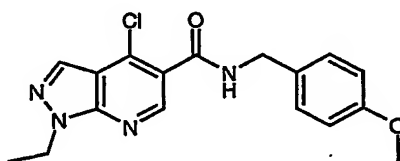
A solution of hydrogen chloride in dioxan (0.5ml, 2.0mmol, 4M) was added to a stirred solution of *tert*-butyl 4-oxocyclohexylcarbamate (0.043g, 0.20mmol, commercially available from Astatech Inc., Philadelphia, USA) in dioxan (0.5ml) and the mixture was stirred at room temperature. After 1h, the reaction mixture was evaporated to give Intermediate 54 as a cream solid (34mg). 1H NMR (400MHz in d_6 -DMSO, 27°C, δ ppm) 8.09 (br. s, 3H), 3.51 (tt, 1H, 3.5Hz, 1H), 2.45 (m, 2H, partially obscured), 2.29 (m, 2H), 2.16 (m, 2H), 1.76 (m, 2H).

Intermediate 54A: N-Benzyl-4-(cyclohexylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

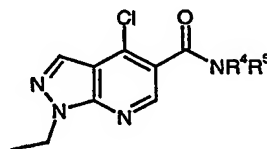


5 Benzylamine (0.16ml) was added to a stirred mixture of Intermediate 49 (0.13g), DIPEA (0.26ml) and HATU (0.285g) in DMF (3ml). The resultant mixture was heated with stirring at 85 °C for 16 hours. Further portions of HATU (0.14g), DIPEA (0.13ml) and benzylamine (0.082ml) were added and the mixture heated for 16 hours at 88 °C. The resultant solution was concentrated, diluted with dichloromethane (20ml) and washed with saturated sodium bicarbonate solution (20ml), separated by hydrophobic frit and the organic layer concentrated. The residue was purified on a SPE cartridge (silica, 20g) eluting with 60-80% ethyl acetate in cyclohexane. The residue was purified further on a SPE cartridge (Isolute SCX sulphonic acid cartridge, 5g x2), eluting with methanol (2x20ml) and 10% ammonia in methanol (4x20ml); the basic fractions were combined and concentrated to give Intermediate 54A as a white solid (0.07g). LCMS showed MH^+ = 350; T_{RET} = 2.99min.

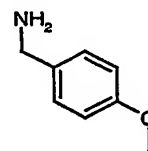
Intermediate 55: 4-Chloro-1-ethyl-N- {[4-(methoxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



That is, Intermediate 55 is:



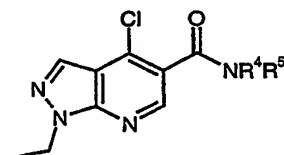
Where $NR^4R^5 =$



25 Intermediate 15 (1.04g) was treated with thionyl chloride (13.22g). The mixture was stirred and heated at 75 °C for 2h. Excess thionyl chloride was removed *in vacuo* and the residual oil azeotroped with toluene to afford Intermediate 16, presumed to be the acid chloride derivative of intermediate 15, as a cream solid (1.12g).

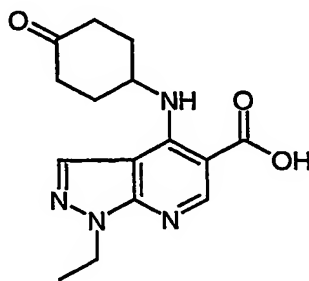
Intermediate 16 (0.997g) was dissolved in tetrahydrofuran (THF) (25ml) and treated with N,N-diisopropylethylamine (1.07ml) then with 1-[4-(methyloxy)phenyl]methanamine = 4-methoxybenzylamine (0.54ml) (obtainable from e.g. Aldrich, Acros, or *Tetrahedron Lett.*, 2002, 43(48), 8735; or Meindl et al., *J. Med. Chem.*, 1984, 27(9), 1111; or *Organic Letters*, 2002, 4(12), 2055) and the mixture was stirred for 3h. The solution was concentrated *in vacuo*, then partitioned between DCM and water. The layers were separated and the organics concentrated *in vacuo*. The solid was then triturated in 1:1 ethyl acetate: cyclohexane to give Intermediate 55 (1.27g). LCMS showed $MH^+ = 345$, $T_{RET} = 2.86$ min.

Similarly prepared were the following:



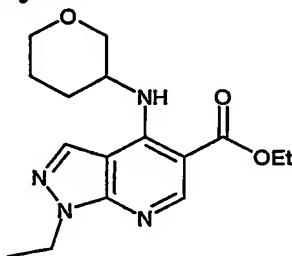
	NR^4R^5	Source of HNR^4R^5	MH^+ ion	T_{RET} (min)
Intermediate 56		Lis et al., <i>J. Med. Chem.</i> , 1990, 33(10), 2883, see Scheme III and ref. 24	408	2.60
Intermediate 57		Maybridge-Int; or Aldrich; or TCI-America	341	3.08

Intermediate 58: 1-Ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



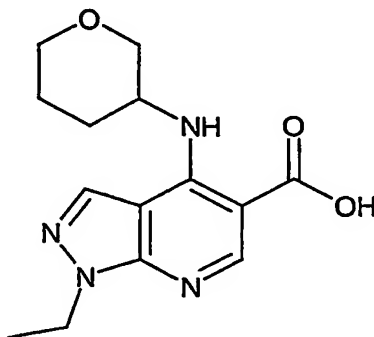
A solution of sodium hydroxide (0.053g, 1.32mmol) in water (0.41ml) was added to a stirred solution of Example 205 (0.1g, 0.303mmol) in ethanol (1ml), and the resulting mixture was heated at 50°C. After 1h, the cooled reaction mixture was adjusted to pH3 with 2M hydrochloric acid, and extracted with EtOAc (2 x 6ml). The combined organic extracts were dried (Na₂SO₄) and evaporated to give Intermediate 58 (0.072g) as a white solid. LCMS showed MH⁺ = 303; T_{RET} = 2.13min.

Intermediate 58A: Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



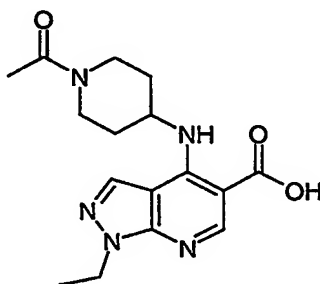
Intermediate 1 (0.76g, 3.0mmol) was dissolved in acetonitrile (10ml). Tetrahydro-2H-pyran-3-amine hydrochloride (0.5g, 3.6mmol, *Anales De Quimica*, 1988, **84**, 148) and *N,N*-diisopropylethylamine (3.14ml, 18.0mmol) were added and the mixture was stirred at 85°C for 24h. After 24h a further portion of tetrahydro-2H-pyran-3-amine hydrochloride (0.14g, 1.02mmol) was added and stirring was continued at 85°C. After a further 8h, the mixture was concentrated *in vacuo*. The residue was partitioned between DCM (20ml) and water (12ml). The layers were separated and the aqueous layer was extracted with further DCM (12ml). The combined organic extracts were dried (Na₂SO₄), and concentrated *in vacuo* to give a brown solid which was purified on a SPE cartridge (silica, 20g) eluting with a gradient of ethyl acetate:cyclohexane (1:16, 1:8, 1:4, 1:2, 1:1, 1:0). Fractions containing the desired material were combined and evaporated to afford Intermediate 58A (0.89g). LCMS showed MH⁺ = 319; T_{RET} = 2.92 min.

Intermediate 59: 1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylic acid



A solution of Intermediate 58A (0.89g, 2.79mmol) in ethanol (16.7ml) was treated with sodium hydroxide (0.47g, 11.7mmol) as a solution in water (3.1ml). The mixture was stirred at 50 °C. After 12h, the reaction mixture was concentrated *in vacuo* to give a residual oil which was dissolved in water (16ml), then cooled and acidified to pH 3 with 2M hydrochloric acid. After stirring at 0°C for 30min, the resulting precipitate was collected by filtration, washed with cooled water (2ml) and dried in vacuo to afford Intermediate 59 as a white solid (0.73g). LCMS showed $MH^+ = 291$; $T_{RET} = 2.19$ min.

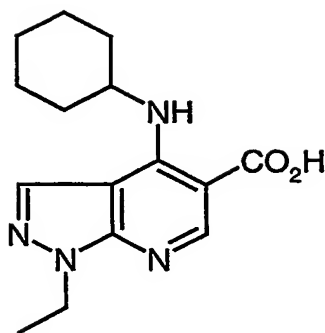
10 **Intermediate 60:** 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid



15 Aqueous sodium hydroxide solution (8.55ml, 2M) was added to a solution of Example 207 (1.55g) in EtOH (13ml). The mixture was heated at 50 °C for 18h then neutralised using aqueous hydrochloric acid and evaporated in vacuo to afford a mixture of 1-ethyl-4-(4-piperidinylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid and 4-[(1-acetyl-4-piperidiny)amino]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid

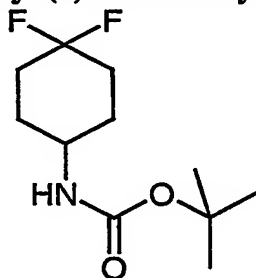
20 Acetic acid (0.36ml) was added to a stirred mixture of HATU (2.41g) and N,N-diisopropylethylamine (2.21ml) in N,N-dimethylformamide (65ml). After stirring for 15 min the mixture was added to the mixture of 1-ethyl-4-(4-piperidinylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid and 4-[(1-acetyl-4-piperidiny)amino]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid and the reaction stirred for 15h. The reaction mixture was evaporated in vacuo and the residue purified by chromatography using Biotage (silica 90g) eluting with DCM : MeOH (0% - 5% MeOH) to afford Intermediate 60 (1.36g) as a white solid. LCMS showed $MH^+ 334$; $T_{RET} = 2.06$ min.

30 **Intermediate 61:** 4-(Cyclohexylamino)-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylic acid



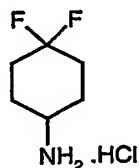
A solution of Example 2 (5.37g, 17mmol) in ethanol (30ml) was treated with a solution of sodium hydroxide (2.72g, 68mmol) in water (20ml), and the resulting mixture was stirred at 50°C for 3h. The reaction mixture was concentrated in vacuo, dissolved in water (250ml) and the cooled solution was acidified to pH 1 with 5M-hydrochloric acid. The resultant solid was collected by filtration and dried in vacuo to afford Intermediate 61 as a white solid (4.7g). LCMS showed $MH^+ = 289$; $T_{RET} = 2.83min$.

Intermediate 62: 1,1-Dimethylethyl (4,4-difluorocyclohexyl)carbamate



(Diethylamino)sulphur trifluoride (DAST), (0.06ml, 0.47mmol), was added to a stirred solution of 1,1-dimethylethyl(4-oxocyclohexyl)carbamate, (250mg, 1.17mmol, commercially available from AstaTech Inc., Philadelphia, USA) in anhydrous dichloromethane (5ml) and the mixture was stirred under nitrogen at 20°C. After 22h, the reaction mixture was cooled to 0°C, treated with saturated sodium hydrogen carbonate solution (4ml), and then allowed to warm to ambient temperature. The phases were separated by passage through a hydrophobic frit and the aqueous phase was further extracted with DCM (5ml). The combined organic phases were concentrated in vacuo to give an orange solid (369mg) which was further purified by chromatography using a SPE cartridge (silica, 10g), eluting with DCM to afford Intermediate 62 (140mg) containing 20% of 1,1-dimethylethyl (4-fluoro-3-cyclohexen-1-yl)carbamate. 1H NMR (400MHz in $CDCl_3$, 27°C, δ ppm)

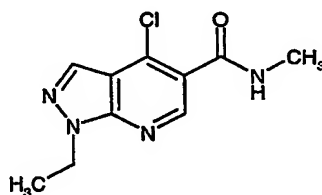
Minor component: δ 5.11 (dm, 16Hz, 1H), 4.56 (br, 1H), 3.80 (br, 1H) 2.45-1.45 (m's, 6H excess), 1.43 (s, 9H). Major component: δ 4.43 (br, 1H), 3.58 (br, 1H), 2.45-1.45 (m's, 8H excess), 1.45 (s, 9H).

Intermediate 63: (4,4-Difluorocyclohexyl)amine hydrochloride

- 5 A solution of hydrogen chloride in dioxane (4M, 1.6ml) was added at 20°C to a stirred solution of Intermediate 62 (140mg, 0.6mmol), in dioxane (1.6ml). After 3h, the reaction mixture was concentrated in vacuo to afford intermediate 63 (96.5mg) containing 4-fluoro-3-cyclohexen-1-amine. ¹H NMR (400MHz in d₆-DMSO, 27°C, δppm) Minor component: δ8.22 (br, 3H excess), 5.18 (dm, 16Hz, 1H), 3.28-3.13 (m, 1H excess), 2.41-1.53 (m's, 6H excess). Major component: δ8.22 (br, 3H excess), 3.28-3.13 (m, 1H excess), 2.41-1.53 (m's, 8H excess). Impurities are also present.
- 10

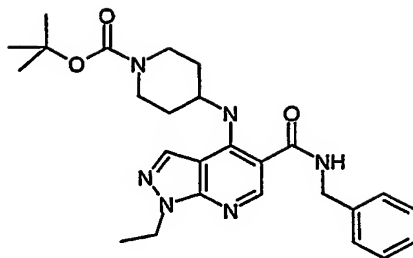
Intermediate 64: 4-Chloro-1-ethyl-N-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

15



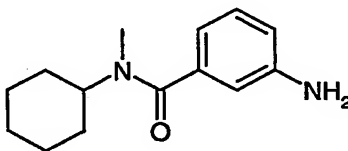
- Intermediate 15 (0.06g, 0.266mmol) was treated with thionyl chloride (0.48ml). The mixture was stirred and heated at 75°C for 2h. Excess thionyl chloride was removed in vacuo and the residual oil azeotroped with dichloromethane (DCM) to afford Intermediate 16, presumed to be the acid chloride derivative of Intermediate 15, as a white solid. Intermediate 16 was dissolved in anhydrous tetrahydrofuran (THF) (2ml) and treated with N,N-diisopropylethylamine (DIPEA) (0.069ml), then with methylamine (2M in tetrahydrofuran, 0.15ml) and the mixture stirred under nitrogen for 16h. A further 0.05ml of methylamine (2M in THF) was added and the solution stirred for 2h. The mixture was concentrated in vacuo, then partitioned between dichloromethane (2ml) and aqueous sodium hydroxide solution (2M, 2ml), then the organic layer washed with water (2ml). The layers were separated and the organics concentrated in vacuo to afford Intermediate 64 (0.052g). LCMS showed MH⁺ = 239; T_{RET} = 2.17min.
- 20
- 25
- 30

Intermediate 65: Ethyl 4-[(1-[(1,1-dimethylethyl)oxy]carbonyl)-4-piperidinyl]amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



A mixture of intermediate 17 (2.0g, 6.37mmol), 1,1-dimethylethyl 4-amino-1-piperidinecarboxylate (2.04g, 10.2mmol) and N,N-diisopropylethylamine (5.54ml, 31.9mmol) in MeCN (40ml) was heated at 85 °C for 42h. The reaction was evaporated and the residues partitioned between DCM and water. The organic phase was dried (MgSO₄) then evaporated in vacuo. The residue was chromatographed on silica (Biotage, 90g) eluting with cyclohexane : EtOAc (1:1) to give Intermediate 65 as a white solid (2.70g). LCMS showed MH⁺ = 479; T_{RET} = 3.37min.

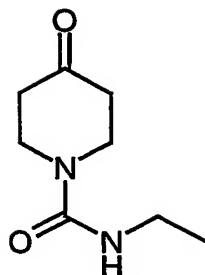
Intermediate 67: 3-Amino-N-cyclohexyl-N-methylbenzamide



A solution of 3-nitrobenzoyl chloride (2.0g, 10.78mmol) in DCM (20ml) was added dropwise to a stirred mixture of N-methylcyclohexylamine (1.83ml, 14.01mmol), N,N-diisopropylethylamine (3.76ml, 21.56mmol) and N,N-dimethylaminopyridine (0.01g) in DCM at 20 °C. The reaction mixture was stirred for 56h then evaporated in vacuo. The residue was partitioned between ethyl acetate and water. The organic phase was washed with aqueous HCl then dried (MgSO₄) and evaporated in vacuo. The residue was purified by chromatography on silica eluting with cyclohexane : EtOAc (9:1 followed by 2:1) to afford N-cyclohexyl-N-methyl-3-nitrobenzamide (1.40g). MS showed MH⁺ 263.

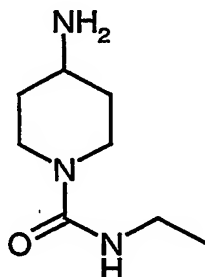
A mixture of N-Cyclohexyl-N-methyl-3-nitrobenzamide (1.40g, 5.35mmol) and palladium on carbon (5%, 0.140g) in ethanol (10ml) was stirred under an atmosphere of hydrogen for 1 hour. The reaction mixture was filtered through Celite and the filtrate evaporated to afford Intermediate 67 as a brown solid (0.107g). LCMS showed MH⁺ = 233; T_{RET} = 2.56min.

Intermediate 68: N-Ethyl-4-oxo-1-piperidinecarboxamide



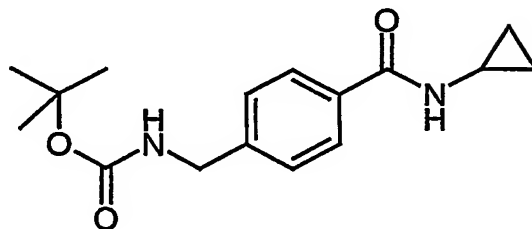
5 A solution of ethyl isocyanate (2.31g, 32.5mmol) in DCM (40ml) was added, dropwise over 15min, to a vigorously stirred solution of 4-piperidone monohydrate hydrochloride (5.0g, 32.5mmol, commercially available from Aldrich) and sodium hydrogen carbonate (8.2g, 97.5mmol) in water (60ml) at 0°C. The reaction mixture was stirred at room temperature for 20h. Sodium chloride (7.0g) was added to the reaction mixture and the organic phase was separated. The aqueous phase was extracted with further DCM (3 x 75ml). The combined organic extracts were dried (Na₂SO₄) and evaporated in vacuo to give a white solid (4.0g). Recrystallisation from ethyl acetate: cyclohexane (10:1) 10 afforded Intermediate 68 as a white solid (2.3g).
TLC (silica) gave R_f = 0.24 (ethyl acetate). Anal. Found: C, 56.7; H, 8.3; N, 16.35. C₈H₁₄N₂O₂ requires C, 56.5; H, 8.3; N, 16.5.

15 **Intermediate 69:** 4-Amino-N-ethyl-1-piperidinecarboxamide



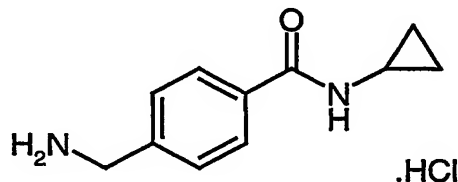
20 A solution of Intermediate 68 (1.5g, 8.8mmol) and benzylamine (1.04g, 9.7mmol) in absolute ethanol (60ml) was hydrogenated over pre-reduced 10% palladium on charcoal catalyst (0.6g) in ethanol (20ml) until the uptake of hydrogen had ceased (22h). The reaction mixture was filtered through filter agent (Celite), and then through silica gel (100ml) eluting with ethanol:0.88-ammonia (100:1) to give a black oil. The oil was dissolved in ethanol (30ml) and treated with a solution of hydrogen chloride in ethanol 25 (3M) until the solution was acidic. The solvent was evaporated and the residue was triturated with ethanol to afford Intermediate 69 as a white solid (1.09g).
TLC (silica) gave R_f = 0.73 (ethyl acetate:methanol, 10:1). Anal. Found: C, 45.9; H, 8.4; N, 19.8. C₈H₁₈ClN₃O requires C, 46.3; H, 8.7; N, 20.2.

Intermediate 70: 1,1-Dimethylethyl ({4-[(cyclopropylamino)carbonyl]phenyl)methyl}methyl)carbamate



5 Cyclopropylamine (0.136g, 2.39mmol) and diisopropylethylamine (0.68ml, 3.9mmol) were added to a stirred solution of 4-[[[(1,1-dimethylethyl)oxy]carbonyl]amino]-methyl]benzoic acid (0.501g, 2.0mmol), EDC (0.612g, 3.2mmol) and HOBT (0.35g, 2.6mmol) in DMF (2ml). The resulting mixture was stirred at room temperature
10 overnight. Solvents were removed in vacuo, and the residue was dissolved in ethyl acetate (20ml) and washed with 0.5M-hydrochloric acid (3 x 20ml). The organic phase was dried (Na₂SO₄) and evaporated in vacuo to give the crude product which was purified by Biotage chromatography (silica) eluting with ethyl acetate:cyclohexane (1.3:1) to afford Intermediate 70 as a white solid (0.512g). LCMS showed MH⁺ = 291; T_{RET} =
15 2.75min.

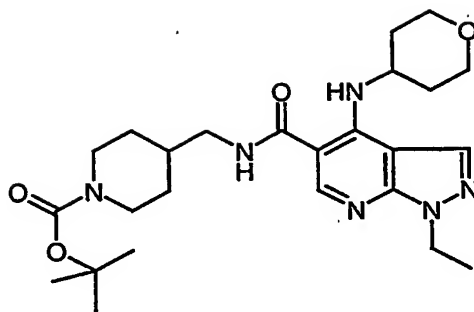
Intermediate 71: 4-(Aminomethyl)-N-cyclopropylbenzamide hydrochloride



20 Intermediate 70 (0.506g, 1.74mmol) was dissolved in a solution of hydrogen chloride in dioxan (20ml, 4M) under nitrogen. After 1h, methanol (3ml) was added to the mixture and stirring was continued at room temperature overnight. Solvents were removed in
25 vacuo to afford Intermediate 71 as a white solid (0.416g). LCMS showed MH⁺ = 191; T_{RET} = 0.82min.

Intermediate 72

30

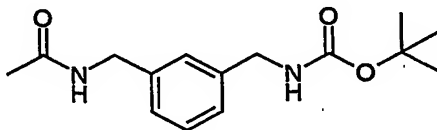


Intermediate 33 (1.36g, 4.7mmol), EDC (1.26g, 6.57mmol) and HOBT (0.76g, 5.62mmol) were suspended in DMF (50ml) and stirred vigorously at room temperature for 0.5h, before adding 1,1-dimethylethyl 4-(aminomethyl)-1-piperidinecarboxylate (1.3g, 6.07mmol, commercially available from Maybridge Chemical Co. Ltd.). After stirring at room temperature overnight, a further quantity of 1,1-dimethylethyl 4-(aminomethyl)-1-piperidinecarboxylate (1.01g, 4.7mmol) was added to the reaction mixture which was then heated at 50°C. After 6h, diisopropylethylamine (0.25ml, 1.44mmol) was added, and the mixture was maintained at 50°C for a further 6h. Solvents were removed in vacuo and the residue was partitioned between DCM (100ml) and water (100ml). The phases were separated by passage through a hydrophobic frit, and the organic phase was evaporated in vacuo to give the crude product. Further purification using SPE cartridges (aminopropyl followed by silica) affords Intermediate 72 as a cream solid (1.24g). LCMS showed $MH^+ = 487$; $T_{RET} = 2.97$ min.

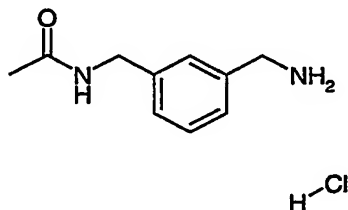
Intermediate 73

Intermediate 73 is used *in situ* in the general procedure for Examples 360-414.

Intermediate 74: 1,1-Dimethylethyl ({3-[(acetylamino)methyl]phenyl}methyl)carbamate



Acetic anhydride (0.52ml, 5.5mmol) was added to a mixture of *tert*-butyl *N*-[3-aminomethyl)benzyl] carbamate (1.1g, 4.65mmol commercially available from Astatech) and triethylamine (0.7ml, 5mmol) in THF (20ml). The reaction mixture was stirred at 20 °C from 16h then concentrated *in vacuo*. The residue was partitioned between EtOAc and water. The organic phase was dried (MgSO₄) and evaporated *in vacuo*. The residue was chromatographed over silica eluting with hexanes : EtOAc (1:1) followed by EtOAc to afford Intermediate 74 (1.2g) as a colourless oil. Anal. Found: C, 64.79; H, 7.93; N, 10.10. C₁₅H₂₂N₂O₃ requires C, 64.73; H, 7.97; N, 10.06. MS ($M+Na$)⁺ 301.

Intermediate 75: *N*-{[3-(Aminomethyl)phenyl]methyl}acetamide hydrochloride

5

Hydrogen chloride in dioxane (4ml, 4M) was added to a solution of Intermediate 74 (1.0g, 3.6mmol) in dioxane (10ml) and the resultant mixture stirred for 6 hours at 20 °C. The reaction was diluted with Et₂O (20ml) and filtered to afford Intermediate 75 (0.7g) as a white solid. MS MH⁺ 179. ¹H NMR (300MHz in d₆-DMSO, 27°C, δppm)

δ 8.6 - 8.4 (br m, 3H), 7.38 - 7.26 (m, 3H), 7.22 (bm, 1H), 4.24 (d, J = 5.7Hz, 2H), 3.95 (dd, J = 11.6, 5.7Hz, 2H), 1.87 (s, 3H).

10

15

Table of Examples

Example Number	Name
1	Ethyl 4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
2	Ethyl 4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
3	Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
4	Ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
5	Ethyl 4-[(1-acetylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
6	Ethyl 4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
7	Ethyl 1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
8	Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
9	Ethyl 1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
10	Ethyl 1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
11	Ethyl 1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
12	Ethyl 4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
13	Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
14	Ethyl 4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
21	N-Benzyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
22	1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
23	N-Cyclopentyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
24	4-(Cyclohexylamino)-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
25	N-Cyclopentyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
27	4-[(1-Acetylpiperidin-4-yl)amino]-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
28	N-Cyclopentyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-

	amine
29	N-Cyclohexyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-amine
30	1-Ethyl-5-(pyrrolidin-1-ylcarbonyl)-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine
31	4-(Cyclopentylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
32	4-(Cyclohexylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
33	1-Ethyl-N-(pyridin-4-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
34	4-(Cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
35	4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
36	1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
39	N-Benzyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
40	N-Benzyl-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
41	4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
42	4-(Cyclopentylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
43	4-(Cyclohexylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
44	1-Ethyl-N-(2-ethylbutyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
45	1-Ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
46	4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
47	4-(Cyclopentylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
48	4-(Cyclohexylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
49	1-Ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
50	4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
51	4-(Cyclopentylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

52	4-(Cyclohexylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
53	1-Ethyl-N-n-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
55	4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
56	N-Benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
57	4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
61	N-Benzyl-4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
62	N-Benzyl-4-(cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
63	N-Benzyl-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
64	4-(Cyclopentylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
65	4-(Cyclohexylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
66	N-(2-Ethylbutyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
67	4-(Cyclopentylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
68	4-(Cyclohexylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
69	N-(4-Fluorophenyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
70	4-(Cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
71	4-(Cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
72	1-Methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
74	4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
76	4-[(1-Acetylpiperidin-4-yl)amino]-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
78	4-[(1-Acetylpiperidin-4-yl)amino]-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
81	1-Ethyl-N-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
82	1-Ethyl-N,N-dimethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-

	b]pyridine-5-carboxamide
83	1-Ethyl-N-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
84	1-Ethyl-N-isopropyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
85	N-Benzyl-1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
86	N-Benzyl-1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
87	N-Benzyl-1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
88	N-Benzyl-4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
89	N-Benzyl-4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
90	N-Benzyl-4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
91	N-Benzyl-1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
92	1-Ethyl-N-(4-fluorophenyl)-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
93	1-Ethyl-N-(4-fluorophenyl)-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
94	1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
95	1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
96	4-(Cyclopropylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
97	4-[(1,1-Dioxidotetrahydrothien-3-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
98	4-[(1,1-Dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

Example No.	Name
100	1-Ethyl-N-[4-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
101	<i>tert</i> -Butyl (1-{[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}piperidin-3-yl)methylcarbamate
102	1-Ethyl-N-[3-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-

	ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
103	1-Ethyl-5-{[5-methoxy-6-(trifluoromethyl)-2,3-dihydro-1 <i>H</i> -indol-1-yl]carbonyl}- <i>N</i> -tetrahydro-2 <i>H</i> -pyran-4-yl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-4-amine
104	<i>N</i> -[(5-Chloropyridin-2-yl)methyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
105	<i>N</i> -(4-Chlorobenzyl)-1-ethyl- <i>N</i> -isopropyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
106	<i>N</i> -(3-Chlorobenzyl)-1-ethyl- <i>N</i> -(2-hydroxyethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
107	1-Ethyl- <i>N</i> -[(5-methyl-3-phenylisoxazol-4-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
108	<i>N</i> -(2- <i>tert</i> -Butoxyethyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
109	1-Ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)- <i>N</i> -(1,3-thiazol-2-ylmethyl)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
110	1-Ethyl- <i>N</i> -(pyrimidin-4-ylmethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
111	1-Ethyl- <i>N</i> -[(2-methyl-1,3-thiazol-4-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
112	<i>N</i> -[3-(<i>tert</i> -Butoxymethyl)benzyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
113	1-Ethyl- <i>N</i> -{2-[methyl(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
114	1-Ethyl- <i>N</i> -(pyrazin-2-ylmethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
115	1-Ethyl-5-{[4-(pyridin-2-ylcarbonyl)piperazin-1-yl]carbonyl}- <i>N</i> -tetrahydro-2 <i>H</i> -pyran-4-yl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-4-amine
116	<i>N</i> -(2-Chloro-6-fluorobenzyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
117	1-Ethyl- <i>N</i> -[(6-oxo-1,6-dihydropyridin-3-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
118	<i>N</i> -[3-(Aminocarbonyl)benzyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
119	1-Ethyl- <i>N</i> -{4-[(methylamino)carbonyl]phenyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
120	1-Ethyl- <i>N</i> -[2-(1-methyl-1 <i>H</i> -imidazol-4-yl)ethyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
121	<i>N</i> -{2-[(Anilinocarbonyl)amino]ethyl}-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
122	1-Ethyl- <i>N</i> -(1 <i>H</i> -tetraazol-5-ylmethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide hydrochloride

123	1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[2-(1H-1,2,4-triazol-1-yl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
124	<i>tert</i> -Butyl 2-[[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl](methylamino)ethylcarbamate
125	1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[4-(trifluoromethyl)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
126	<i>tert</i> -Butyl 4-([1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl)amino)piperidine-1-carboxylate
127	1-Ethyl-N-{3-[(methylsulfonyl)amino]propyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
128	N-[2-(Dimethylamino)benzyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
129	1-Ethyl-N-[(1-ethylpyrrolidin-2-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
130	1-Ethyl-N-(tetrahydrofuran-2-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
131	1-ethyl-N-tetrahydro-2H-pyran-4-yl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
132	N-{4-[(Dimethylamino)sulfonyl]benzyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
133	1-Ethyl-N-{3-[(methylsulfonyl)amino]benzyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
134	1-[[1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]piperidine-2-carboxamide
135	1-Ethyl-N-(4-methoxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
136	1-Ethyl-N-[3-(2-oxopyrrolidin-1-yl)propyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
137	1-Ethyl-N-[2-(1-methylpyrrolidin-2-yl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
138	1-Ethyl-N-(pyridin-3-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
139	1-Ethyl-N-(1-methylpiperidin-4-yl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
140	1-Ethyl-N-(1-ethylpropyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
141	1-Ethyl-N-(2-piperidin-1-ylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
142	1-Ethyl-N-(3-morpholin-4-ylpropyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
143	N-(3-Ethoxypropyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

144	<i>N</i> -(Cyclohexylmethyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
145	<i>N</i> -[3-(Dimethylamino)propyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
146	1-Ethyl- <i>N</i> -neopentyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
147	1-ethyl- <i>N</i> -(4-methoxybenzyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
148	1-Ethyl- <i>N</i> -{2-[(phenylsulfonyl)amino]ethyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
149	<i>N</i> -[2-(Acetylamino)ethyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
150	1-Ethyl- <i>N</i> -{2-[(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
151	1-Ethyl- <i>N</i> -methyl- <i>N</i> -(pyridin-4-ylmethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
152	1-Ethyl- <i>N</i> -{2-[(2-methoxyphenyl)(methyl)amino]ethyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
153	1-Ethyl- <i>N</i> -(2-oxo-2-phenylethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
154	<i>N</i> -(2,5-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
155	1-Ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)- <i>N</i> -[4-(trifluoromethyl)benzyl]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
156	<i>N</i> ,1-Diethyl- <i>N</i> -propyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
157	<i>N</i> -Cyclopropyl-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
158	<i>N</i> -(2-amino-2-oxoethyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
159	1-Ethyl- <i>N</i> -(3-methoxyphenyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
160	<i>N</i> -(3,4-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
161	Ethyl 3-([1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-5-yl]carbonyl)amino)propanoate
162	<i>N</i> -(1-Benzylpiperidin-4-yl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
163	<i>N</i> -Butyl-4-([1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-5-yl]carbonyl)piperazine-1-carboxamide
164	1-Ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)- <i>N</i> -(1,3,4-thiadiazol-2-yl)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide

165	<i>N</i> -(2,3-Dihydro-1 <i>H</i> -inden-2-yl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
166	1-Ethyl- <i>N</i> -[2-(2-oxoimidazolidin-1-yl)ethyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
167	<i>N</i> -(3,4-Dimethoxybenzyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
168	<i>N</i> -(3-Chlorobenzyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
169	1-Ethyl-5-[(4-methylpiperazin-1-yl)carbonyl]- <i>N</i> -tetrahydro-2 <i>H</i> -pyran-4-yl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-4-amine
170	1-Ethyl- <i>N</i> -(2-hydroxyethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
171	1-Ethyl-5-[[4-(4-methoxyphenyl)piperazin-1-yl]carbonyl]- <i>N</i> -tetrahydro-2 <i>H</i> -pyran-4-yl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridin-4-amine
172	1-Ethyl- <i>N</i> -{4-[(methylsulfonyl)methyl]phenyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
173	<i>N</i> -[3-(dimethylamino)-3-oxopropyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
174	1-Ethyl- <i>N</i> -[(1-methyl-1 <i>H</i> -imidazol-5-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
175	1-Ethyl- <i>N</i> -{4-[(methylamino)sulfonyl]phenyl}-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
176	<i>N</i> -(2-Cyanoethyl)-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
177	1-Ethyl- <i>N</i> -methyl- <i>N</i> -[(5-methyl-1,3,4-oxadiazol-2-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
178	1-Ethyl- <i>N</i> -[(1-methyl-1 <i>H</i> -pyrazol-4-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
179	1-Ethyl- <i>N</i> -methyl- <i>N</i> -[(1-methyl-1 <i>H</i> -imidazol-2-yl)methyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
180	1-Ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)- <i>N</i> -(2-thien-2-ylethyl)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
181	<i>N</i> -[2-(4-Chlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
182	1-Ethyl- <i>N</i> -[2-(2-methoxyphenyl)ethyl]-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
183	Ethyl 4-(cyclohexylamino)-1-(3-ethoxy-3-oxopropyl)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
185	Ethyl 1- <i>n</i> -propyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate

186	Ethyl 1-(2-hydroxyethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
187	N-[4-(Methylsulfonyl)benzyl]-1-n-propyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
188	N-(4-Fluorophenyl)-1-n-propyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
189	Ethyl 1-ethyl-6-methyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
190	Ethyl 4-(cyclohexylamino)-1-ethyl-6-methyl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
191	4-(Cyclohexylamino)-1-ethyl-6-methyl- <i>N</i> -[4-(methylsulfonyl)benzyl]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
192	<i>N</i> -Benzyl-4-(cyclohexylamino)-1-ethyl-6-methyl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
193	4-(Cyclohexylamino)-1-ethyl- <i>N</i> -(4-fluorophenyl)-6-methyl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
194	4-(Cyclohexylamino)-1-ethyl-6-methyl- <i>N</i> -[4-(trifluoromethyl)benzyl]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
195	4-(Cyclohexylamino)- <i>N</i> -(2,3-dihydro-1 <i>H</i> -inden-2-yl)-1-ethyl-6-methyl-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
196	<i>N</i> -Benzyl-1-ethyl-6-methyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
197	<i>N</i> -Benzyl-1-ethyl-4-[(2-oxoazepan-3-yl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
198	<i>N</i> -Benzyl-1-ethyl-4-[(3-hydroxycyclohexyl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide; also called <i>N</i> -benzyl-1-ethyl-4-[(3-hydroxycyclohexan-1-yl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
199	<i>N</i> -Benzyl-1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide; also called <i>N</i> -benzyl-1-ethyl-4-[(4-hydroxycyclohexan-1-yl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
200	<i>N</i> -Benzyl-1-ethyl-4-[(3-hydroxycyclopentyl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide; also called <i>N</i> -benzyl-1-ethyl-4-[(3-hydroxycyclopentan-1-yl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
201	<i>N</i> -Benzyl-1-ethyl-4-[(4-oxocyclohexyl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide; also called <i>N</i> -Benzyl-1-ethyl-4-[(4-oxocyclohexan-1-yl)amino]-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
202	1-Ethyl- <i>N</i> -(2-hydroxy-1-methylethyl)-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
203	Methyl (2 <i>S</i>)-2-([1-ethyl-4-(tetrahydro-2 <i>H</i> -pyran-4-ylamino)-1 <i>H</i> -

pyrazolo[3,4- <i>b</i>]pyridin-5-yl]carbonyl)amino)-3-hydroxypropanoate
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Exa- mple no.	Name
204	Ethyl 1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
205	Ethyl 1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
207	Ethyl 4-[(1-acetyl-4-piperidiny]amino]-1-ethyl-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
209	Ethyl 4-[(4-aminocyclohexyl)amino]-1-ethyl-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxylate
210	Ethyl-N-[(1-oxido-3-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
211	1-Ethyl-N-[(1-oxido-2-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
212	1-Ethyl-N-[(1-oxido-4-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
214	4-[(cis-4-Aminocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
221	4-(Cyclobutylamino)-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
222	4-(Cycloheptylamino)-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
223	1-Ethyl-4-[(4-methylcyclohexyl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
224	1-Ethyl-4-[(3-methylcyclohexyl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
225	1-Ethyl-4-[(1-methylcyclohexyl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
226	4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
227	4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
228	1-Ethyl-4-[[[(3S)-2-oxo-3-pyrrolidinyl]amino]-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
229	4-[(2,5-Dioxo-3-pyrrolidinyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
230	4-(1-Azabicyclo[2.2.2]oct-3-ylamino)-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
231	1-Ethyl-4-[(1-methylcyclohexyl)amino]-N-{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
233	4-(Cyclobutylamino)-1-ethyl-N-{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
234	4-(Cycloheptylamino)-1-ethyl-N-{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4- <i>b</i>]pyridine-5-carboxamide
235	4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-{[4-(methyloxy)phenyl]methyl}-

- 1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 236 1-Ethyl-4-[(4-methylcyclohexyl)amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 237 1-Ethyl-4-[(3-methylcyclohexyl)amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 238 4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 239 4-[(cis-4-Aminocyclohexyl)amino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 240 4-(Cycloheptylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 241 4-(Cyclobutylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 242 4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 243 4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 244 1-Ethyl-4-[(4-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 245 1-Ethyl-4-[(3-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 247 1-Ethyl-4-[(1-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 248 4-[(cis-4-Aminocyclohexyl)amino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 249 4-(Cyclohexylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 250 4-(Cycloheptylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 251 4-(Cyclobutylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 253 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(3-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 254 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(4-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 255 4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 256 4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 257 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(1-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 258 4-[(cis-4-Aminocyclohexyl)amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 259 1-Ethyl-N-{4-[(methylsulfonyl)methyl]phenyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 260 N-[(2,4-Dimethylphenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 261 N-[(3,4-Dimethylphenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 262 N-[(3,4-Dichlorophenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 263 1-Ethyl-N-{[4-(methyloxy)phenyl]methyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 264 1-Ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 265 N-{[4-(Dimethylamino)phenyl]methyl}-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 266 N-({4-[(Difluoromethyl)oxy]phenyl}methyl)-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 267 1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-{[4-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 268 1-Ethyl-N-{[4-(methylsulfonyl)phenyl]methyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 269 1-Ethyl-N-(4-fluorophenyl)-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 270 1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-(2-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 271 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 272 N-(1-Acetyl-4-piperidiny)-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 273 1-Ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 274 N,1-Diethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 275 1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 276 1-Ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 277 N-({4-[(Difluoromethyl)oxy]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 278 1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-N-{[4-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 279 1-Ethyl-N-{[4-(methylsulfonyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 280 1-Ethyl-N-{4-[(methylsulfonyl)methyl]phenyl}-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 281 1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 282 1-Ethyl-N-(2-pyridinylmethyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 283 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 284 N-(1-Acetyl-4-piperidiny)-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 285 1-Ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 286 N,1-Diethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 287 1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 288 4-[(4,4-Difluorocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 289 1-Ethyl-4-[(4-fluoro-3-cyclohexen-1-yl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide.
- 290 4-[(1-Acetyl-4-piperidiny)amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 291 4-[(1-Acetyl-4-piperidiny)amino]-N-[(3,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 292 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-N-[(3-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 293 4-[(1-Acetyl-4-piperidiny)amino]-N-[(3,4-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 294 4-[(1-Acetyl-4-piperidiny)amino]-N-[(2,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 295 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-N-{[3-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 296 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-N-{[4-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 297 4-[(1-Acetyl-4-piperidiny)amino]-N-[(2,6-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 298 4-[(1-Acetyl-4-piperidiny)amino]-N-[(3-chlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 299 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-N-{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 300 4-[(1-Acetyl-4-piperidiny)amino]-1-ethyl-N-[4-(methyloxy)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 301 4-[(1-Acetyl-4-piperidiny)amino]-N-({4-[(dimethylamino)sulfonyl]phenyl}methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 302 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 303 4-[(1-Acetyl-4-piperidinyl)amino]-N-{[2-(dimethylamino)phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 304 4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 305 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[(2-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 306 4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2-chloro-6-fluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 307 4-[(1-Acetyl-4-piperidinyl)amino]-N-{[4-[(difluoromethyl)oxy]phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 308 4-[(1-Acetyl-4-piperidinyl)amino]-N-{[3-chloro-4-(methyloxy)phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 309 4-[(1-Acetyl-4-piperidinyl)amino]-N-[(5-chloro-2-pyridinyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 310 4-[(1-Acetyl-4-piperidinyl)amino]-N-(5-chloro-2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 311 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 312 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-{[4-(methylsulfonyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 313 4-[(1-Acetyl-4-piperidinyl)amino]-N-(2,2-diphenylethyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 314 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 315 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({4-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 316 4-[(1-Acetyl-4-piperidinyl)amino]-N-{[4-(aminosulfonyl)phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 317 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({3-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 318 4-[(1-Acetyl-4-piperidinyl)amino]-N-{[4-(aminocarbonyl)phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 319 4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-{[6-(methyloxy)-3-pyridinyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 320 1-Ethyl-N-4-piperidinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 321 1-Ethyl-N-(4-piperidinylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 322 1-Ethyl-N-[1-(ethylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 323 1-Ethyl-N-{1-[(1-methylethyl)sulfonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-

- 1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 324 N-[1-(Cyclopentylsulfonyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 325 1-Ethyl-N-[1-(methylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 326 1-Ethyl-N-{1-[(phenylmethyl)sulfonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 327 1-Ethyl-N-[1-(phenylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 328 1-Ethyl-N-[1-(propylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 329 N-[1-(Cyclopropylcarbonyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 330 1-Ethyl-N-[1-(3-furanylcarbonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 331 N-[1-(3,3-Dimethylbutanoyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 332 1-Ethyl-N-[1-(2-ethylbutanoyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 333 N-[1-(Cyclopentylacetyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 334 1-Ethyl-N-[1-(2-methylpropanoyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 335 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[1-(tetrahydro-2H-pyran-4-ylcarbonyl)-4-piperidinyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 336 1-Ethyl-N-(1-propanoyl-4-piperidinyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 337 N-[1-(N-Acetylglycyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 338 1-Ethyl-N-[1-(4-morpholinylacetyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 339 1-Ethyl-N-{1-[(4-oxocyclohexyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 340 1-Ethyl-N-[1-(1-piperidinylacetyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 341 1-Ethyl-N-{1-[(1-methyl-5-oxo-3-pyrrolidinyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 342 1-Ethyl-N-{1-[(3-methyl-3-oxetanyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 343 1-Ethyl-N-{1-[(4-fluorophenyl)acetyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 344 N-{[1-(3,3-Dimethylbutanoyl)-4-piperidinyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 345 N-{{1-(Cyclopentylacetyl)-4-piperidinyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 346 N-{{1-(Cyclopropylcarbonyl)-4-piperidinyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 347 1-Ethyl-N-({1-[(4-oxocyclohexyl)carbonyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 348 1-Ethyl-N-({1-[(4-fluorophenyl)acetyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 349 1-Ethyl-N-({1-[(1-methyl-5-oxo-3-pyrrolidinyl)carbonyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 350 Methyl 3-[(1-ethyl-5-{{(phenylmethyl)amino}carbonyl}-1H-pyrazolo[3,4-b]pyridin-4-yl)amino]cyclohexanecarboxylate
- 351 3-[(1-Ethyl-5-{{(phenylmethyl)amino}carbonyl}-1H-pyrazolo[3,4-b]pyridin-4-yl)amino]cyclohexanecarboxylic acid
- 352 1-Ethyl-N-(phenylmethyl)-4-(4-piperidinylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 353 Ethyl 1-ethyl-4-({1-[(methyloxy)acetyl]-4-piperidinyl}amino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
- 354 Ethyl 1-(1-methylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
- 355 4-(Cyclohexylamino)-1-ethyl-N-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 356 1-Ethyl-N-(4-fluorophenyl)-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 357 1-Ethyl-6-methyl-N-{{4-(methylsulfonyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 358 N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 360 1-Ethyl-N-[3-(1-piperidinylcarbonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 361 1-Ethyl-N-[4-(1-methylethyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 362 1-Ethyl-N-(2-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 363 N-{3-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 364 N-{4-[(Difluoromethyl)oxy]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 365 N-{4-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 366 1-Ethyl-N-(4-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 367 1-Ethyl-N-[4-(4-morpholinyl)-2-(trifluoromethyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 368 1-Ethyl-N-4-pyridinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 369 1-Ethyl-N-{4-[(4-methyl-1-piperazinyl)carbonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 370 1-Ethyl-N-[2-(2-oxo-1-pyrrolidinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 371 1-Ethyl-N-[3-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 372 N-{3-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 373 1-Ethyl-N-{3-[(methylsulfonyl)amino]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 374 1-Ethyl-N-(4-fluoro-2-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 375 N-(4-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 376 N-(3-Chloro-2-cyanophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 377 1-Ethyl-N-[3-(1-piperidinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 379 1-Ethyl-N-[2-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 380 N-{2-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 381 1-Ethyl-N-[3-(4-morpholinylcarbonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 382 N-(4-Chloro-3-cyanophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 383 1-Ethyl-N-(3-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 384 N-(3-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 386 N-[3-[(Acetylamino)methyl]-4-(methyloxy)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 387 1-Ethyl-N-[4-(1-piperidinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 388 N-{3-[[Cyclohexyl(methyl)amino]carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 389 1-Ethyl-N-[2-(4-morpholinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 390 N-{3-[(Acetylamino)sulfonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 391 N-(3-Chloro-4-hydroxyphenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-

- pyrazolo[3,4-b]pyridine-5-carboxamide
- 392 1-Ethyl-N-{4-[(methylsulfonyl)amino]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 393 1-Ethyl-N-{3-[(methylamino)carbonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 394 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[3-(trifluoromethyl)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 395 1-Ethyl-N-3-pyridinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 396 N-(3,4-Dichlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 397 N-[3-(Aminosulfonyl)-4-chlorophenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 398 1-Ethyl-N-[3-(4-morpholinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 399 1-Ethyl-N-[4-(4-morpholinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 400 1-Ethyl-N-{2-[(4-methyl-1-piperazinyl)carbonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 401 N-{2-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 402 N-[2-Chloro-4-(trifluoromethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 403 N-{2-[(Acetylamino)methyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 404 N-(2-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 405 N-(3-Chloro-2-fluorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 406 1-Ethyl-N-(3-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 407 N-(2-Cyano-3-fluorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 408 1-Ethyl-N-[4-(propylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 409 N-{4-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 411 1-Ethyl-N-[4-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 413 N-{4-[(Acetylamino)methyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 414 1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 415 N-[2-(Aminosulfonyl)ethyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-

- carboxamide
- 416 N-(2-Amino-2-oxoethyl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide (non-preferred name)
- 417 4-(Cyclohexylamino)-1-ethyl-N-{2-[(methylsulfonyl)amino]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 418 4-(Cyclohexylamino)-1-ethyl-N-(tetrahydro-2H-pyran-4-yl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 419 4-(Cyclohexylamino)-1-ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 420 4-(Cyclohexylamino)-1-ethyl-N-{[3-(methylsulfonyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 421 N-{[3-(Aminocarbonyl)phenyl]methyl}-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 422 4-(Cyclohexylamino)-1-ethyl-N-(tetrahydro-2-furanylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 423 4-(Cyclohexylamino)-N-({4-[(dimethylamino)sulfonyl]phenyl}methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 424 N-[(5-Chloro-2-pyridinyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 425 4-(Cyclohexylamino)-1-ethyl-N-{[4-(methylsulfonyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 426 4-(Cyclohexylamino)-1-ethyl-N-{[6-(methyloxy)-3-pyridinyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 427 4-(Cyclohexylamino)-1-ethyl-N-{4-[(methylamino)carbonyl]phenyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 428 4-(Cyclohexylamino)-1-ethyl-N-({3-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 429 N-{[4-(Aminocarbonyl)phenyl]methyl}-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 430 4-(Cyclohexylamino)-1-ethyl-N-[(4-hydroxyphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 431 4-(Cyclohexylamino)-1-ethyl-N-{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 432 4-(Cyclohexylamino)-N-[(3,4-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 433 4-(Cyclohexylamino)-1-ethyl-N-{[4-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 434 4-(Cyclohexylamino)-1-ethyl-N-({3-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 435 4-(Cyclohexylamino)-N-[(2,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 436 4-(Cyclohexylamino)-1-ethyl-N-[(4-methylphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 438 4-(Cyclohexylamino)-1-ethyl-N-(2-{4-[(methylsulfonyl)amino]phenyl}ethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 439 4-(Cyclohexylamino)-1-ethyl-N-[(2-hydroxyphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 440 4-(Cyclohexylamino)-N-[(3,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 441 4-(Cyclohexylamino)-N-[(3,5-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 442 4-(Cyclohexylamino)-1-ethyl-N-(2-phenylethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 443 4-(Cyclohexylamino)-1-ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 444 4-(Cyclohexylamino)-1-ethyl-N-{[2-(methylsulfinyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 445 4-(Cyclohexylamino)-1-ethyl-N-[2-(4-hydroxyphenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 446 N-{2-[4-(Aminosulfonyl)phenyl]ethyl}-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 447 4-(Cyclohexylamino)-1-ethyl-N-({2-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 448 4-(Cyclohexylamino)-1-ethyl-N-{[2-(methylsulfonyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 449 Methyl 2-(((4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl)amino)methyl]benzoate
- 450 4-(Cyclohexylamino)-1-ethyl-N-{2-[4-(methylsulfonyl)phenyl]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 451 N-[4,5-Bis(methyloxy)-2,3-dihydro-1H-inden-2-yl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 452 4-(Cyclohexylamino)-1-ethyl-N-{[2-fluoro-3-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 453 4-(Cyclohexylamino)-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 454 4-(Cyclohexylamino)-1-ethyl-N-[2-(4-fluorophenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 455 4-(Cyclohexylamino)-1-ethyl-N-[2-(4-methylphenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 456 4-(Cyclohexylamino)-1-ethyl-N-{2-[4-(methyloxy)phenyl]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 457 4-(Cyclohexylamino)-1-ethyl-N-(2-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 458 4-(Cyclohexylamino)-N-[(3,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 459 4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-1-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 460 4-(Cyclohexylamino)-N-{[4-(dimethylamino)phenyl]methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 461 4-(Cyclohexylamino)-1-ethyl-N-[(2-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 462 N-[[2,4-Bis(methyloxy)phenyl]methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 463 N-[(6-Chloro-2-pyridinyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 464 N-([2-[Acetyl(methyl)amino]phenyl]methyl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 465 4-(Cyclohexylamino)-1-ethyl-N-{[4-fluoro-3-(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 466 4-(Cyclohexylamino)-N-[(1R)-2,3-dihydro-1H-inden-1-yl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 467 4-(Cyclohexylamino)-N-[(2,6-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 468 Methyl 3-[[([4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl)amino)methyl]benzoate
- 469 4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 470 Methyl 4-[[([4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl)amino)methyl]benzoate
- 471 4-(Cyclohexylamino)-1-ethyl-N-(1H-tetrazol-5-yl)methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 472 4-(Cyclohexylamino)-N-([4-[(difluoromethyl)oxy]phenyl]methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 473 4-(Cyclohexylamino)-1-ethyl-N-[(2-methyl-1,3-thiazol-4-yl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 474 N-[(2-Chloro-6-fluorophenyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 475 N-([2-(Aminocarbonyl)phenyl]methyl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 477 4-(Cyclohexylamino)-N-([2-(dimethylamino)phenyl]methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 478 4-(Cyclohexylamino)-1-ethyl-N-[(4-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 479 4-(Cyclohexylamino)-1-ethyl-N-([3-(trifluoromethyl)phenyl]methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 480 4-(Cyclohexylamino)-N-[(2,6-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 481 4-(Cyclohexylamino)-1-ethyl-N-[(3-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 482 4-(Cyclohexylamino)-1-ethyl-N-([2-(trifluoromethyl)phenyl]methyl)-1H-pyrazolo[3,4-

- b]pyridine-5-carboxamide
- 483 N-(5-Chloro-2,3-dihydro-1H-inden-2-yl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 484 4-(Cyclohexylamino)-1-ethyl-N-({4-[(methylamino)carbonyl]phenyl)methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 485 4-(Cyclohexylamino)-1-ethyl-N-[4-(methyloxy)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 486 4-(cyclohexylamino)-1-ethyl-N-[(6-oxo-1,6-dihydro-3-pyridinyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 487 4-(Cyclohexylamino)-1-ethyl-N-(3-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 488 4-[[{4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)methyl]benzoic acid
- 489 3-[[{4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)methyl]benzoic acid
- 490 4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide hydrochloride
- 491 4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide methanesulphonate
- 492 N-({2-[(1,1-Dimethylethyl)oxy]-3-pyridinyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 493 N-[(3-Chloro-4-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 494 N-[(4-Chloro-2-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 495 N-({2-[(Difluoromethyl)oxy]phenyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 496 1-Ethyl-N-({2-[(1-methylethyl)oxy]phenyl)methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 497 1-Ethyl-N-({3-[(1-methylethyl)oxy]phenyl)methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 498 N-({3-[(Difluoromethyl)oxy]phenyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 499 1-Ethyl-N-({4-hydroxy-3-(methyloxy)phenyl)methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 500 N-[(5-Acetyl-2-hydroxyphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 501 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-{2-[3-(trifluoromethyl)phenyl]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 502 N-({4-(Acetylamino)phenyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 503 1-Ethyl-N-[2-(3-hydroxyphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 504 N-[2-(3-Chlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 505 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-(2-{4-[(trifluoromethyl)oxy]phenyl}ethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 506 1-Ethyl-N-{2-[3-(methyloxy)phenyl]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 507 N-[2-(4-Acetylphenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 508 N-[2-(3,4-Dichlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 509 N-{2-[3-(Aminosulfonyl)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 510 N-{2-[3,4-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 512 N-[2-(2,3-Dichlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 513 N-{2-[3,5-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 514 1-Ethyl-N-[2-[3-methyl-4-(methyloxy)phenyl]ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 515 N-[2-(2,6-Difluorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 516 N-{2-[2,6-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 517 1-Ethyl-N-[2-(2-methylphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 518 N-[(3,4-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 519 N-[4,5-Bis(methyloxy)-2,3-dihydro-1H-inden-2-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 521 N-{2-[4-(Aminosulfonyl)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 522 1-Ethyl-N-{[2-(methylsulfinyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 523 1-Ethyl-N-(2-phenylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 524 N-{[4-(Dimethylamino)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 525 1-Ethyl-N-[2-(4-fluorophenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 526 1-Ethyl-N-[2-(4-methylphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 527 N-{[3-(Aminosulfonyl)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-

- pyrazolo[3,4-b]pyridine-5-carboxamide
- 528 1-Ethyl-N-[(4-methylphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 530 1-Ethyl-N-{[4-fluoro-3-(trifluoromethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 531 Methyl 2-[(1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl]amino)methyl]benzoate
- 532 N-[(6-Chloro-2-pyridinyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 533 N-(2,3-Dihydro-1H-inden-1-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 534 N-({2-[Acetyl(methyl)amino]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 535 N-[(1S)-2,3-Dihydro-1H-inden-1-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 536 N-[(1R)-2,3-Dihydro-1H-inden-1-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 537 1-Ethyl-N-({3-[(methylsulfonyl)amino]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 538 1-Ethyl-N-(phenylmethyl)-N-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 540 N-[2-(Dimethylamino)ethyl]-1-ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 541 N-Butyl-1-ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 542 N,1-Diethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 544 1-Ethyl-N-(1-phenyl-4-piperidinyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 545 1-ethyl-N-{1-[(ethylamino)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 546 Formic acid - 1-ethyl-N-[1-methyl-2-(4-methyl-1-piperazinyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide (1:1)
- 547 Methyl [4-({1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl]amino)-1-piperidinyl]acetate
- 548 1-Ethyl-N-{[4-(4-morpholinylmethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 549 1-Ethyl-N-({3-[(4-methyl-1-piperazinyl)methyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 550 N-({5-(Aminocarbonyl)-3-pyridinyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 551 1-Ethyl-N-{[4-(1-methylethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 552 N-{{3-(Cyclopentyloxy)-4-(methyloxy)phenyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 553 1-Ethyl-N-({4-[(4-methyl-1-piperazinyl)methyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 554 N-[(2,4-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 555 N-[(2,4-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 556 N-[(2-Chloro-4-fluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 557 N-{2-[2-Chloro-3-(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 558 Methyl 3-[[{1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino)methyl]benzoate
- 559 1-Ethyl-N-{{3-(1-pyrrolidinylmethyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate
- 560 1-Ethyl-N-(2-{4-[(methylsulfonyl)amino]phenyl}ethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 561 N-{{2,5-Bis(methyloxy)phenyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 562 N-{{2,6-Bis(methyloxy)phenyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 563 1-Ethyl-N-[(2-fluorophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 564 N-[(3,5-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 565 N-[(4-Chlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 567 N-Cyclohexyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 568 1-Ethyl-N-{2-[4-(methylsulfonyl)phenyl]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 569 1-Ethyl-N-{{2-fluoro-3-(trifluoromethyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 570 N-({4-[(Cyclopropylamino)carbonyl]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 571 1-Ethyl-N-{{4-(4-methyl-1-piperazinyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 572 1-Ethyl-N-{{4-(1-pyrrolidinylmethyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 573 1-Ethyl-N-[6-(methyloxy)-1-oxo-2,3-dihydro-1H-inden-2-yl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 574 N-[(2,5-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-

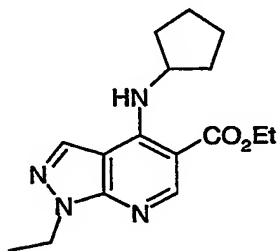
- pyrazolo[3,4-b]pyridine-5-carboxamide
- 575 N-[(3,5-Diethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 576 N-[(2,3-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 577 1-Ethyl-N-[[2-(methylsulfonyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 578 1-Ethyl-N-[(3-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 579 N-[[3,5-Bis(methyloxy)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 580 1-Ethyl-N-[2-(4-hydroxyphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 581 N-[(3,5-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 582 N-[[2,4-Bis(methyloxy)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 583 1-Ethyl-N-[[2-(methyloxy)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 584 N-[(2,4-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 585 1-Ethyl-N-({2-[(methylamino)carbonyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 586 1-Ethyl-N-{2-[4-(methyloxy)phenyl]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 587 N-[(2-Chlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 588 1-Ethyl-N-[(2-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 589 N-(1,3-Benzodioxol-5-ylmethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 590 1-Ethyl-N-[3-(methyloxy)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 591 N-(Cyclohexylmethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 592 1-Ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 593 Methyl 4-[(1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl]amino)methyl]benzoate
- 594 N-[(3,4-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 595 N-[[4-(Aminocarbonyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 596 N-[(2,6-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 597 N-[[3-(Aminocarbonyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 598 1-Ethyl-N-[(4-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 599 1-Ethyl-N-[[6-(methyloxy)-3-pyridinyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 600 1-Ethyl-N-(2-pyridinylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 601 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[[3-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 602 N-[4-(2-Amino-2-oxoethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 603 1-Ethyl-N-({4-[(methylamino)carbonyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 604 1-Ethyl-N-{4-[2-(methylamino)-2-oxoethyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 605 1-Ethyl-N-[(3-fluorophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 606 1-Ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 607 N-[[4-(Aminosulfonyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 608 N-[[2-(Aminocarbonyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 609 N-({4-[(Difluoromethyl)oxy]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 610 N-({3-[(Dimethylamino)methyl]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 611 N-[[3-Chloro-4-(methyloxy)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 612 N-(1-Acetyl-4-piperidinyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 613 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[[2-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 615 N-(5-Chloro-2,3-dihydro-1H-inden-2-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 616 N-({3-[(Acetylamino)methyl]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 617 1-Ethyl-N-[(4-fluorophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 618 1-Ethyl-N-{{4-fluoro-2-(trifluoromethyl)phenyl}methyl}-4-(tetrahydro-2H-pyran-4-

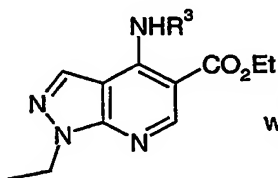
- ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 619 1-Ethyl-N-[(2-ethylphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 620 1-Ethyl-N-{[2-fluoro-5-(trifluoromethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 621 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[(2,3,4-trifluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 622 N-[(4-Chloro-2-fluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 623 N-[(4-Bromo-2-fluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 624 N-[(3,5-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 625 N-[(2,3-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 626 N-[(2,3-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 627 N-[(4-Cyanophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 628 N-[(4-Bromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 629 1-Ethyl-N-{[5-fluoro-2-(trifluoromethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 630 1-Ethyl-N-[(4-iodophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 631 N-{[4-(1,1-Dimethylethyl)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 632 N-[(3-Cyanophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 633 N-[(2,6-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 634 N-[(5-Chloro-2-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 635 N-[(3,5-Dibromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 636 1-Ethyl-N-[(4-ethylphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 637 1-Ethyl-N-{[3-fluoro-4-(trifluoromethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 638 1-Ethyl-N-[(2-iodophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 639 N-[(2-Bromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

- 640 1-Ethyl-N-{{[4-(hydroxymethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 641 1-Ethyl-N-{{[3-(hydroxymethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 642 1-Ethyl-N-{{[3-(hydroxymethyl)-2-methylphenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 643 N-{{[2,3-Dichloro-6-(hydroxymethyl)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 644 N-{{[2,4-Dichloro-6-methylphenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 645 1-Ethyl-N-{{[4-(2-methylpropyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 646 N-{{[2,5-dimethylphenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 647 1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-{{[2,4,5-trifluorophenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 648 1-Ethyl-N-{{[2-fluoro-4-(trifluoromethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 649 N-{{[2-Chloro-6-methylphenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 650 4-[[{[1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)methyl]benzoic acid sodium salt
- 651 3-[[{[1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)methyl]benzoic acid
- 652 Ethyl 1-ethyl-4-{{[4-(hydroxyimino)cyclohexyl]amino}-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
- 653 1-Ethyl-4-{{[4-(hydroxyimino)cyclohexyl]amino}-N-{{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 654 N-{{[4-(Dimethylamino)phenyl]methyl}-1-ethyl-4-{{[4-(hydroxyimino)cyclohexyl]amino}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 655 1-Ethyl-4-{{[4-((ethyloxy)imino)cyclohexyl]amino}-N-{{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 656 1-Ethyl-4-{{[4-((methyloxy)imino)cyclohexyl]amino}-N-{{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 657 4-[[4-{{[(1,1-Dimethylethyl)oxy]imino}cyclohexyl}amino]-1-ethyl-N-{{[4-(methyloxy)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 658 1-Ethyl-N-{{[4-(methyloxy)phenyl]methyl}-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 659 Ethyl 1-ethyl-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
- 660 4-[[cis-4-(Butylamino)cyclohexyl]amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 661 4-[(trans-4-Aminocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-

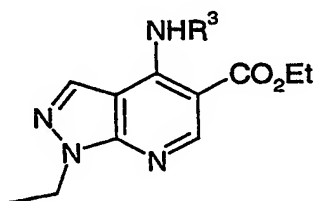
- b]pyridine-5-carboxamide
- 662** 4-[(trans-2-Aminocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 663** 4-[(cis-2-Aminocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
- 664** 4-[(3-Aminocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

Example 1: Ethyl 4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

That is, Example 1 is

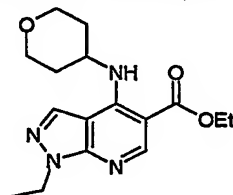
where $\text{NHR}^3 = \text{HN}-\text{Cyclopentyl}$

- 5 Intermediate 1 (0.051g) and cyclopentyl amine (0.019g) were suspended in ethanol (2ml) and triethylamine (0.14ml) was added. The mixture was stirred under nitrogen and heated at 80°C for 16h. After cooling to room temperature, ethanol was removed by evaporation under a stream of nitrogen and the residue partitioned between dichloromethane (DCM) and water. The layers were separated and the organic layer was loaded directly onto an
- 10 solid phase extraction (SPE) cartridge (silica, 5g) which was eluted sequentially with; (i) DCM, (ii) DCM : Et₂O (2:1), (iii) DCM : Et₂O (1:1), (iv) Et₂O, (v) EtOAc, (vi) MeOH. Fractions containing desired material were combined and concentrated in vacuo to afford Example 1 (0.074g). LCMS showed $\text{MH}^+ = 303$; $T_{\text{RET}} = 3.45\text{min}$.
- 15 Similarly prepared were the following:



	NHR^3	Amine reagent	MH^+ ion	$T_{\text{RET}}(\text{min})$
Example 2		Cyclohexyl amine	317	3.65
Example 3		4-Amino tetrahydropyran	319	2.93
Example 4		Intermediate 7	332	2.17
Example 5		Intermediate 6	360	3.20

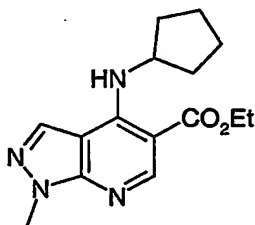
Example 3 (=Intermediate 32): Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



5 Instead of the method shown above (called Method A), the compound of Example 3 can also be made using the following method:

Example 3, Method B: Intermediate 1 (2.5g) was dissolved in acetonitrile (15ml). 4-Aminotetrahydropyran hydrochloride (1.1g) and N,N-diisopropylethylamine (9.4ml) were added and the mixture stirred under nitrogen at 85°C for 16h. A trace of starting material remained, so an additional portion of 4-aminotetrahydropyran hydrochloride (0.11g) was added and stirring continued at 85°C for a further 16h. The mixture was then concentrated in vacuo. The residue was partitioned between DCM and water. The layers were separated and the organic layer was washed with further water (2x20ml) then dried (Na₂SO₄) and concentrated in vacuo. The residue was further purified by chromatography using Biotage (silica, 90g), eluting with cyclohexane : ethyl acetate to afford Example 21 (2.45g). LCMS showed MH⁺ = 319; T_{RET} = 2.90min.

Example 6: Ethyl 4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

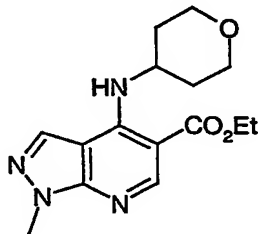


20

Intermediate 3 (0.045g) was placed in a Reactivial™ and treated with cyclopentyl amine (0.07ml). The mixture was heated at 90°C for 2h, then allowed to cool to room temperature and partitioned between chloroform (2ml) and water (1ml). The layers were separated and the organic phase was evaporated to a brown solid, which was purified by mass directed autoprep HPLC, to afford Example 6 as a white solid (0.008g). LCMS showed MH⁺ = 289; T_{RET} = 3.22 min.

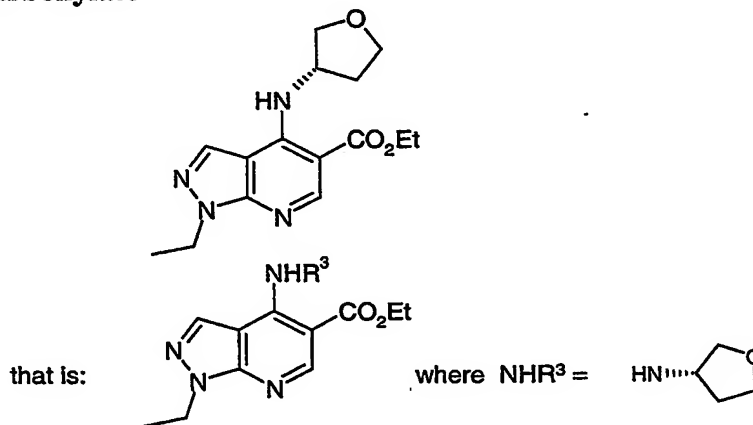
25

Example 7: Ethyl 1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



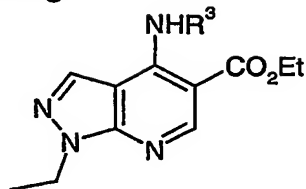
- 5 Intermediate 3 (0.035g) was placed in a Reactivial™ and treated with 4-amino tetrahydropyran (0.06ml). The mixture was heated at 90°C for 2h, then allowed to cool to room temperature and partitioned between chloroform (2ml) and water (1ml). The layers were separated and the organic phase was concentrated, then applied to a preparative TLC plate (silica, 20cm x 20cm x 1mm) which was eluted with ethyl acetate. The required band was removed from the plate and the silica washed with ethyl acetate (2 x 15ml). Concentration of the ethyl acetate solution *in vacuo* afforded Example 7 as a white solid (0.008g). LCMS showed $MH^+ = 305$; $T_{RET} = 2.67$ min.

15 **Example 8: Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate**



- 20 Intermediate 1 (0.05g) and (S)-(-)-3-aminotetrahydrofuran 4-toluene sulphonate (0.052g) were suspended in ethanol (1ml) and triethylamine (0.14ml) was added. The mixture was stirred under nitrogen and heated at 80°C for 24h. After cooling to room temperature, ethanol was removed by evaporation under a stream of nitrogen and the residue partitioned between DCM (2ml) and water (1.5ml). The layers were separated and the organic layer concentrated to dryness. Purification was carried out using an SPE cartridge (silica, 5g), eluting with a gradient of EtOAc : cyclohexane; (1:16 then, 1:8, 1:4, 1:2, 1:1 and 1:0). Fractions containing desired material were combined and concentrated in vacuo
- 25 to afford Example 8 (0.052g). LCMS showed $MH^+ = 305$; $T_{RET} = 2.70$ min.

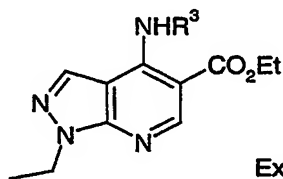
Similarly prepared were the following:



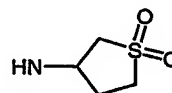
	NHR ³	Amine Reagent	MH ⁺ ion	T _{RET} (min)
Example 9		(R)-(+)-3-Aminotetrahydrofuran 4-toluene sulphonate	305	2.73
Example 10		Intermediate 11	335	3.21
Example 11 (mixture of enantiomers)		Intermediate 12	321	3.10
Example 12		Cyclopropyl amine	275	2.98

5

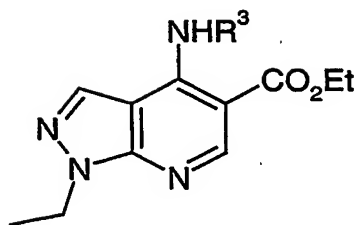
Example 13: Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



Example 13 NHR³ =

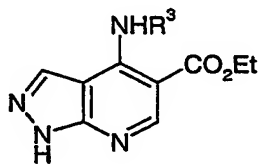


- 10 Intermediate 1 (0.05g) and Intermediate 13 (0.027g) were suspended in ethanol (1ml) and triethylamine (0.14ml) was added. The mixture was stirred under nitrogen and heated at 80°C for 24h. After cooling to room temperature, ethanol was removed by evaporation under a stream of nitrogen and the residue partitioned between DCM (2ml) and water (1.5ml). The layers were separated and the organic layer concentrated to dryness.
- 15 Purification was carried out using an SPE cartridge (silica, 5g), eluting with a gradient of EtOAc : cyclohexane; (1:8 then 1:4, 1:2, 1:1 and 1:0). Fractions containing desired material were combined and concentrated in vacuo to afford Example 13 (0.045g) as a mixture of enantiomers. LCMS showed MH⁺ = 353; T_{RET} = 2.60min.
- 20 Similarly prepared was the following:



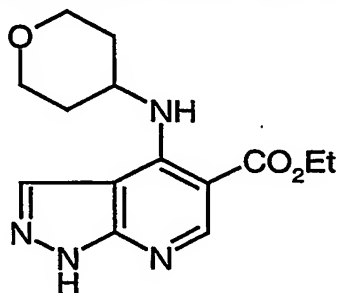
	NHR ³	Amine Reagent	MH ⁺ ion	T _{RET} (min)
Example 14		Intermediate 14	367	2.64

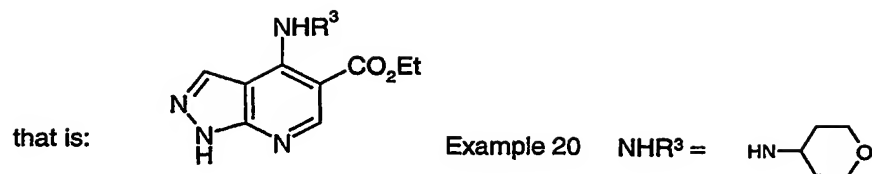
5 **Example 19 (reference example, as an intermediate): Ethyl 4-(cyclopentylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate**



- 10 Intermediate 2 (0.035g) was placed in a Reactivial™ and treated with cyclopentyl amine (0.05ml). The mixture was heated at 90°C for 1.5h, then allowed to cool to room temperature and partitioned between chloroform (2ml) and water (1ml). The layers were separated and the organic phase was concentrated. The residual solid was triturated with Et₂O and the insoluble off-white solid collected and air-dried to afford Example 19
- 15 (0.016g). LCMS showed MH⁺ = 275; T_{RET} = 2.58 min.

Example 20 (reference example, as an intermediate): Ethyl 4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



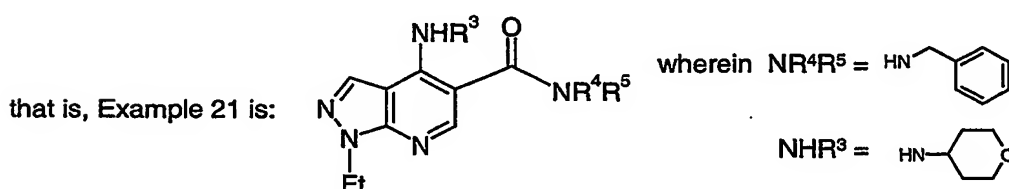
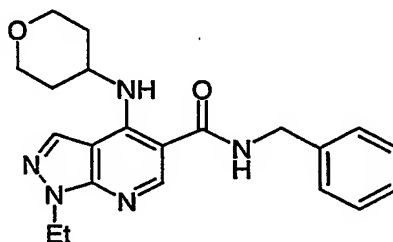


Intermediate 2 (0.035g) was placed in a Reactivial™ and treated with 4-aminotetrahydropyran (0.05ml). The mixture was heated at 90°C for 1.5h, then allowed to cool to room temperature and partitioned between chloroform (2ml) and water (1ml). The layers were separated and the organic phase was concentrated. The crude product was purified by mass directed autoprep HPLC to afford Example 20 as an off-white solid (0.011g). LCMS showed $\text{MH}^+ = 291$; $T_{\text{RET}} = 2.08$ min.

10 Alternative synthetic method for Example 20:

Intermediate 2 (2g) was suspended in 4-aminotetrahydropyran (2g), and the mixture was heated at 90 °C for 6h. The residual mixture was allowed to cool to room temperature and partitioned between chloroform (50ml) and water (50ml). The phases were separated and the organic phase was evaporated to dryness. The residue was triturated with Et₂O (30ml) and the insoluble solid was collected and dried to afford Example 20 as a cream solid (2.24g). LCMS showed $\text{MH}^+ = 291$; $T_{\text{RET}} = 2.19$ min.

Example 21: N-benzyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



5.

Three alternative methods, A, B and C, have been used to make Example 21, as follows:

Example 21, Method A:

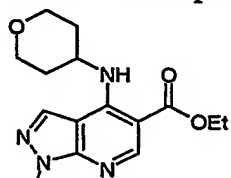
A solution of the 4-chloro Intermediate 17 (0.031g, 0.1 mmol) in ethanol (1.9ml) was treated with triethylamine (0.07ml, 0.5 mmol), followed by a 0.1M ethanolic solution of 4-aminotetrahydropyran (Intermediate 8, 1.1ml of the 0.1M ethanolic solution = 0.11 mmol). The mixture was heated at reflux (80°C) for 18h. A further portion of 4-aminotetrahydropyran (0.01ml of undiluted amine, not a solution thereof) was then added and heating continued for a further 24h. Volatiles were removed in vacuo and the residue dissolved in dichloromethane (DCM), then applied to an solid phase extraction (SPE) cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol. Fractions containing desired material were concentrated in vacuo to afford Example 21 (0.004g). LCMS showed $\text{MH}^+ = 380$; $\text{T}_{\text{RET}} = 2.92\text{min}$.

20 **Example 21 , Method B:**

Intermediate 17 (0.031g, 0.1 mmol) was dissolved in acetonitrile (1ml). 4-Aminotetrahydropyran hydrochloride (Intermediate 8A, 0.015g, 0.11 mmol) and N,N-diisopropylethylamine (0.08ml, 0.5 mmol) were added and the mixture stirred under nitrogen at 85°C for 16h, then concentrated in vacuo. The residue was partitioned between dichloromethane (DCM) and water. The layers were separated and the organic layer was concentrated in vacuo to afford Example 21 (0.027g). LCMS showed $\text{MH}^+ = 380$; $\text{T}_{\text{RET}} = 2.92\text{ min}$.

Example 21 , Method C:

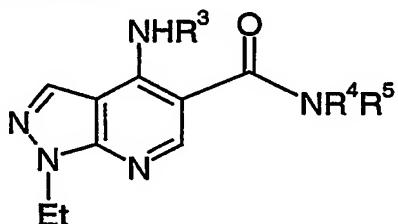
This alternative route C to Example 21 involves formation of the ester of Example 3 =



Intermediate 32 () using one of the methods described above, conversion of the ester of Example 3 / Intermediate 32 into the carboxylic acid

- 5 (Intermediate 33) using the method given above for Intermediate 33, and then amide bond formation to form Example 21 using the method of Examples 81-84 below.

The following compounds can be similarly prepared using one or more of Methods A, B or C above, preferably Method A or B:



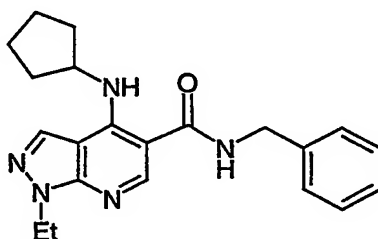
10

	NR ⁴ R ⁵	NHR ³	Starting Material	Amine Reagent	MH ⁺ ion	T _{RET} (min)
Example 22			Intermediate 19	4-amino tetrahydropyran	384	3.09
Example 23			Intermediate 20	Cyclopentyl amine	342	3.29
Example 24			Intermediate 20	Cyclohexyl amine	356	3.47
Example 25			Intermediate 20	4-amino tetrahydropyran	358	2.79
Example 27			Intermediate 20	Intermediate 6	400	2.64
Example 28			Intermediate 21	Cyclopentyl amine	328	2.69
Example 29			Intermediate 21	Cyclohexyl amine	342	2.87
Example 30			Intermediate 21	4-amino tetrahydropyran	344	2.33
Example 31			Intermediate 22	Cyclopentyl amine	365	2.38
Example 32			Intermediate 22	Cyclohexyl amine	379	2.54

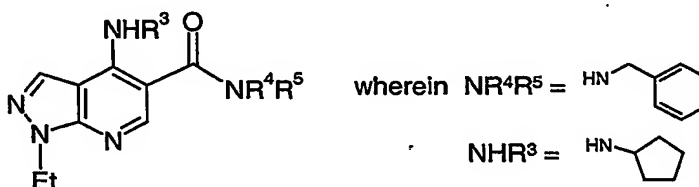
Example 33			Intermediate 22	4-amino tetrahydropyran	381	2.09
Example 34	NH ₂		Intermediate 24	Cyclopentyl amine	274	2.59
Example 35	NH ₂		Intermediate 24	Cyclohexyl amine	288	2.79
Example 36	NH ₂		Intermediate 24	4-amino tetrahydropyran	290	2.22

Example 39: N-Benzyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

5



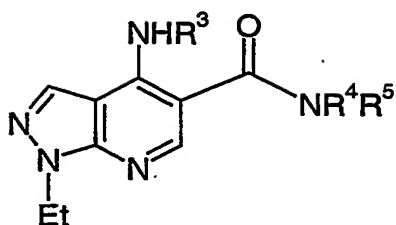
that is, Example 39 is:



10 A solution of Intermediate 17 (0.031g, 0.1 mmol) in ethanol (1ml) was treated with triethylamine (0.07ml, 0.5 mmol), followed by a 0.1M ethanolic solution of cyclopentyl amine (1.1ml of the 0.1M ethanolic solution = 0.11 mmol). The mixture was heated at reflux (80°C) for 18h. A further portion of cyclopentyl amine (0.009ml of undiluted amine, not a solution thereof) was then added and heating continued for a further 24h. Volatiles were removed in vacuo and the residue dissolved in DCM, then applied to an SPE cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol.

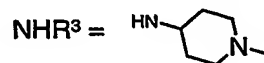
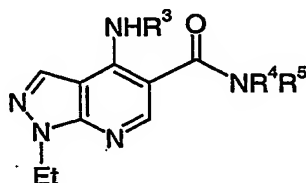
15 The DCM fraction was concentrated in vacuo, then applied to an SPE cartridge (silica, 0.5g) which was eluted sequentially with (i) DCM, (ii) Et₂O, (iii) EtOAc and (iv) MeOH. Fractions containing desired material were combined to afford Example 39 (0.007g). LCMS showed MH⁺ = 364; T_{RET} = 3.38min.

20 Similarly prepared were the following:



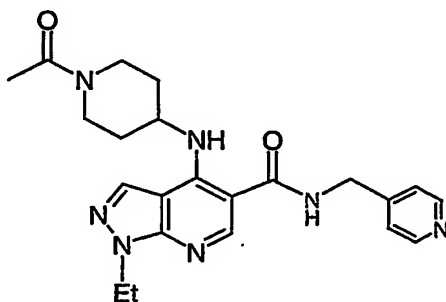
	NR ⁴ R ⁵	NHR ³	Starting Material	Amine reagent	MH ⁺ ion	T _{RET} (min)
Example 40			Intermediate 17	Cyclohexyl amine	378	3.43
Example 41			Intermediate 17	Intermediate 6	421	2.75
Example 42			Intermediate 18	Cyclopentyl amine	358	3.63
Example 43			Intermediate 18	Cyclohexyl amine	372	3.79
Example 44			Intermediate 18	4-amino tetrahydro-pyran	374	3.13
Example 45			Intermediate 18	Intermediate 7	387	2.37
Example 46			Intermediate 18	Intermediate 6	415	2.92
Example 47			Intermediate 19	Cyclopentyl amine	368	3.61
Example 48			Intermediate 19	Cyclohexyl amine	382	3.76
Example 49			Intermediate 19	Intermediate 7	397	2.29
Example 50			Intermediate 19	Intermediate 6	425	2.88
Example 51			Intermediate 23	Cyclopentyl amine	316	3.05
Example 52			Intermediate 23	Cyclohexyl amine	330	3.26
Example 53			Intermediate 23	4-amino tetrahydro-pyran	332	2.58
Example 55			Intermediate 23	Intermediate 6	373	2.46

Example 56: N-Benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

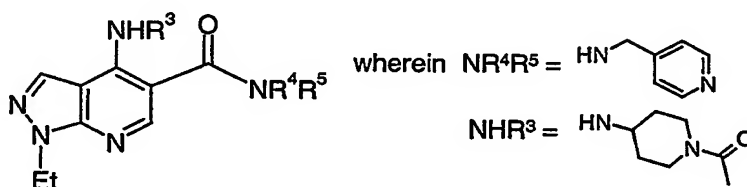


- 5 A solution of Intermediate 17 (0.031g, 0.1 mmol) in ethanol (1ml) was treated with triethylamine (0.07ml, 0.5 mmol), followed by a 0.1M ethanolic solution of Intermediate 7 (1.1ml of the solution = 0.11 mmol). The mixture was heated at reflux (80°C) for 18h. A further portion of Intermediate 7 (0.01ml of undiluted amine) was then added and heating continued for a further 24h. Volatiles were removed in vacuo and the residue
- 10 dissolved in DCM, then applied to an SPE cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol. The DCM fraction was concentrated in vacuo, then applied to an SPE cartridge (silica, 0.5g) which was eluted sequentially with (i) DCM, (ii) Et₂O, (iii) EtOAc and (iv) MeOH. The methanol fraction was concentrated and further purified by SPE (silica, 0.5g) eluting with (i) DCM, (ii) EtOAc and (iii) a stepwise
- 15 gradient of chloroform : methanol (from 99:1 up to 4:1). Fractions containing desired material were combined to afford Example 56 (0.004g). LCMS showed $\text{MH}^+ = 393$; $\text{T}_{\text{RET}} = 2.26\text{min}$.

Example 57: 4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

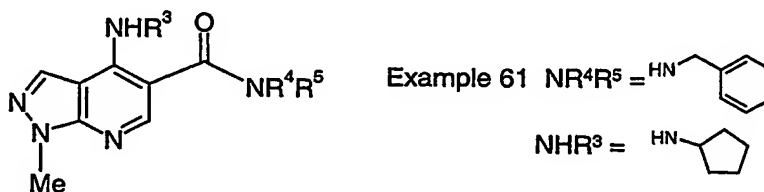


that is, Example 57 is:



- 5 A solution of Intermediate 22 (0.03g, *ca.* 0.1 mmol) in ethanol (1ml) was treated with triethylamine (0.07ml, 0.5 mmol), followed by a 0.1M ethanolic solution of Intermediate 6 (1.1ml of the solution = 0.11 mmol). The mixture was heated at reflux (80°C) for 18h. A further portion of Intermediate 6 (0.01ml, undiluted) was then added and heating continued for a further 24h. Volatiles were removed in vacuo and the residue dissolved in
- 10 DCM, then applied to an SPE cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol.
- The DCM fraction was concentrated in vacuo, then applied to an SPE cartridge (silica, 0.5g) eluting with (i) DCM, (ii) EtOAc and (iii) a stepwise gradient of chloroform : methanol (from 99:1 up to 4:1). Fractions containing desired material were combined to
- 15 afford Example 57 (0.003g). LCMS showed $MH^+ = 422$; $T_{RET} = 2.1\text{min}$.

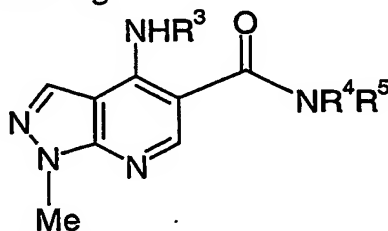
Example 61: N-Benzyl-4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



- A solution of Intermediate 28 (0.03g, 0.1 mmol) in ethanol (1ml) was treated with a 0.1M ethanolic solution of cyclopentyl amine (1.1ml of solution = 0.11 mmol). Triethylamine (0.07ml, 0.5 mmol) was then added and the mixture heated at reflux (85°C), under

- nitrogen for 12h. A further portion of cyclopentyl amine (0.009ml, undiluted) was then added and heating continued for a further 36h. The mixtures were concentrated in vacuo and the residue treated with chloroform. A small amount of insoluble material was collected by filtration, then the filtrate applied to an SPE cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol. Fractions containing desired material were combined to afford Example 61 (0.039g). LCMS showed $MH^+ = 350$; $T_{RET} = 2.88min$.

Similarly prepared were the following:

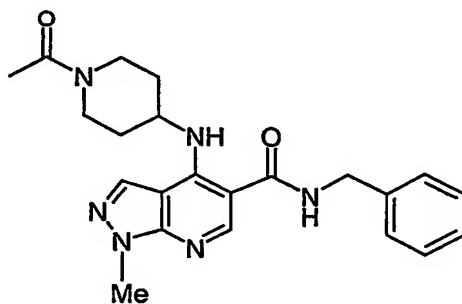


10

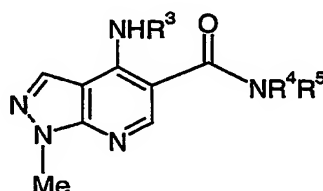
	NR ⁴ R ⁵	NHR ³	Starting Material	Amine Reagent	MH + ion	T _{RET} (min)
Example 62			Intermediate 28	Cyclohexyl amine	364	3.05
Example 63			Intermediate 28	4-amino tetrahydropyran	366	2.52
Example 64			Intermediate 30	Cyclopentyl amine	344	3.06
Example 65			Intermediate 30	Cyclohexyl amine	358	3.23
Example 66			Intermediate 30	4-amino tetrahydropyran	360	2.69
Example 67			Intermediate 29	Cyclopentyl amine	354	3.17
Example 68			Intermediate 29	Cyclohexyl amine	368	3.33
Example 69			Intermediate 29	4-amino tetrahydropyran	370	2.72
Example 70	NH ₂		Intermediate 31	Cyclopentyl amine	260	2.10
Example 71	NH ₂		Intermediate 31	Cyclohexyl amine	274	2.29
Example 72	NH ₂		Intermediate 31	4-amino tetrahydropyran	276	1.86

Example 74: 4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

5



that is, Example 74 is:

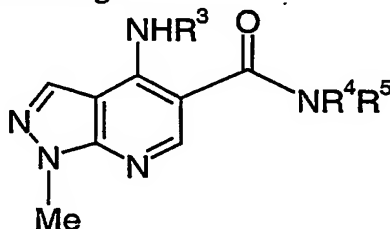


wherein $\text{NR}^4\text{R}^5 =$

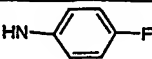
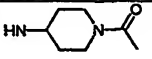
$\text{NHR}^3 =$

A solution of Intermediate 28 (0.03g, 0.1 mmol) in ethanol (1ml) was treated with a 0.1M ethanolic solution of Intermediate 6 (1.1ml of solution = 0.11 mmol). Triethylamine (0.07ml, 0.5 mmol) was then added and the mixture heated at reflux (85°C), under nitrogen for 12h. A further portion of Intermediate 6 (0.1 mmol) was then added and heating continued for a further 36h. The mixtures were concentrated in vacuo and the residue treated with chloroform. A small amount of insoluble material was collected by filtration, then the filtrate applied to an SPE cartridge (aminopropyl, 1g) which was eluted first with DCM, then with methanol. Fractions containing desired material were combined and concentrated in vacuo. The residue was further purified by SPE (silica, 0.5g) eluting with (i) DCM, (ii) chloroform, (iii) EtOAc and (iv) a stepwise gradient of chloroform : methanol (from 99:1 up to 4:1). Fractions containing desired material were combined to afford Example 74 (0.029g). LCMS showed $\text{MH}^+ = 407$; $\text{T}_{\text{RET}} = 2.57$ min.

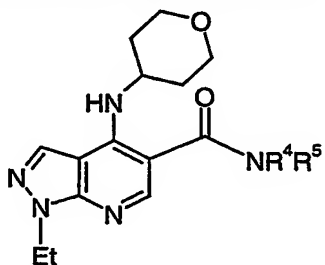
20 Similarly prepared were the following:



	NR^4R^5	NHR^3	Starting Material	Amine Reagent	MH^+ ion	T_{RET} (min)
Example 76			Intermediate 30	Intermediate 6	401	2.74

Example 78			Intermediate 29	Intermediate 6	411	2.69
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Example 81: 1-Ethyl-N-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



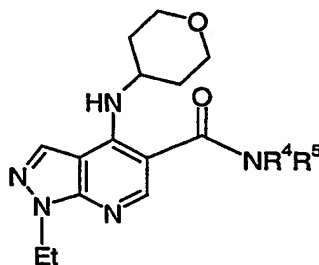
Example 81 $\text{NR}^4\text{R}^5 = \text{NHMe}$

5

To a stirred suspension of Intermediate 33 (0.025g, ca. 0.08 to 0.09 mmol) in chloroform (2ml) was added thionyl chloride (0.025ml) and the mixture stirred at room temperature for 1h. The mixture was cooled to 0°C and methylamine added (2M solution in THF, 0.69ml = 1.38 mmol). After returning to room temperature the mixture was stirred for a further 1h, then quenched by addition of water (4ml) and the layers separated. The organic layer was concentrated then applied to an SPE cartridge (silica, 1g) which was eluted with (i) DCM, (ii) Et₂O (2:1), (iii) EtOAc, (iv) MeOH: EtOAc (1:9). Fractions containing desired material were combined to afford Example 81 (0.019g). LCMS showed $\text{MH}^+ = 304$; $\text{T}_{\text{RET}} = 2.19\text{min}$.

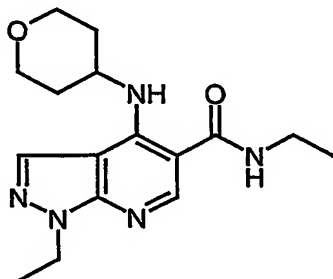
15

Similarly prepared:



	NR^4R^5	Amine reagent	MH^+ ion	T_{RET} (min)
Example 82	NMe ₂	Dimethylamine (2M in THF)	318	2.06
Example 83	NHEt	Ethylamine (2M in THF)	318	2.31
Example 84	NH ⁱ Pr	Isopropylamine (2M in THF)	332	2.44

Example 83: *N*,1-Diethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide; also named 1-ethyl-*N*-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



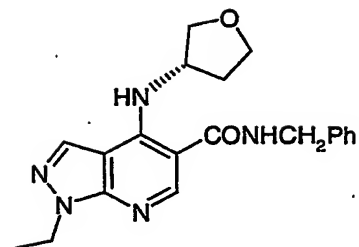
5

In an alternative embodiment to the process described for Examples 81-84 above, Example 83 can be made according to the following method:

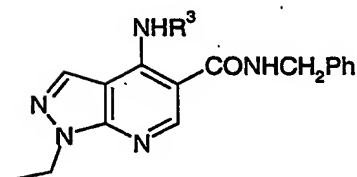
10 A mixture of Intermediate 33 (3.0g, 10.33mmol), EDC (2.25g, 11.7mmol), and HOBT (1.68g, 12.4mmol) was stirred at room temperature for 1 hour. Ethylamine (6.2ml, 12.4mmol, 2M-solution in THF) was added, and stirring was continued at room temperature for 22 hours. The solvents were removed in vacuo, and the residual solid was dissolved in chloroform (250ml) and washed successively with water (70ml) and 5%-
15 sodium hydrogen carbonate solution (70ml). After drying over anhydrous sodium sulphate, the organic solution was evaporated in vacuo to give a pale orange solid (4.15g). This solid was dissolved in a mixture of dichloromethane (15ml) and chloroform (5ml) and purified by column chromatography (Biotage, silica, 100g), eluting initially with EtOAc-cyclohexane (2:1) and finally with neat EtOAc. The product containing
20 fractions were combined and evaporated to give Example 83 as a pale yellow solid (3.05g). LCMS showed $MH^+ = 318$; $T_{RET} = 2.33min$. 1H NMR (400MHz in d_6 -DMSO, 27°C, δ ppm) 9.76 (d, 1H) 8.35 (s, 1H) 7.94 (s, 1H) 5.99 (br m, 1H) 4.47 (q, 2H) 4.16-4.01 (m's, 3H) 3.62 (m, 2H) 3.48 (m, 2H) 2.13 (m, 2H) 1.77 (m, 2H) 1.49 (t, 3H) 1.28 (t, 3H).

25

Example 85: *N*-Benzyl-1-ethyl-4-[(3*S*)-tetrahydrofuran-3-ylamino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



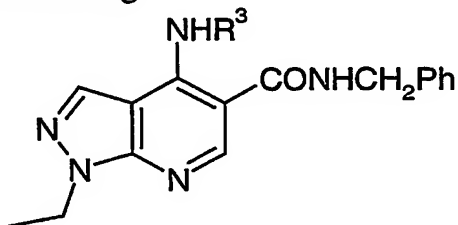
That is, Example 85 is:



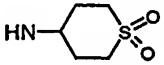
wherein $\text{NHR}^3 = \text{HN} \cdots \text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{O}$

Intermediate 41 (0.017g, 0.062 mmol) was dissolved in DMF (2ml), then treated with HATU (0.023g) followed by diisopropylethyl amine (0.021ml) and the mixture stirred for 10 min. Benzylamine (0.007ml) was then added and stirring continued for a further 64h. The mixture was concentrated in vacuo and the residue dissolved in DCM (1.5ml) then treated with saturated aqueous sodium bicarbonate solution (1.5ml). This mixture was stirred for 30 min, then the layers were separated and the organic layer was applied to an SPE cartridge (silica, 1g) which was eluted sequentially with a gradient of ethyl acetate: cyclohexane (1:4, then 1:2, 1:1, 2:1 and 1:0). Fractions containing desired material were concentrated in vacuo to afford Example 85 (0.017g). LCMS showed $\text{MH}^+ = 366$; $\text{T}_{\text{RET}} = 2.80\text{min}$.

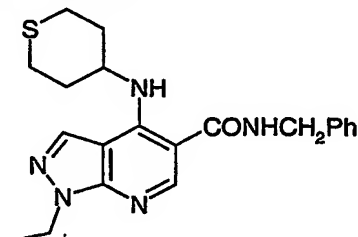
Similarly prepared were the following:



	NHR^3	Starting material	MH^+ ion	T_{RET} (min)
Example 86		Intermediate 42	366	2.80
Example 87		Intermediate 44	382	3.11
Example 88		Intermediate 45	336	3.00
Example 89		Intermediate 46	414	2.69

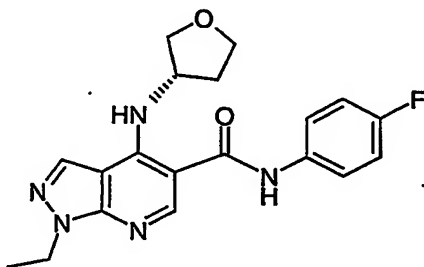
Example 90		Intermediate 47	428	2.75
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Example 91: N-Benzyl-1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

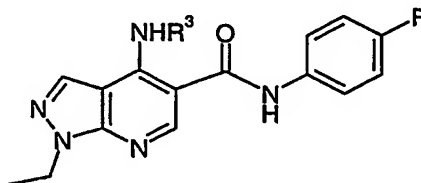


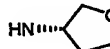
Intermediate 43 (0.019g) was dissolved in DMF (2ml), then treated with HATU (0.024g) followed by diisopropylethyl amine (0.022ml) and the mixture stirred for 10 min. Benzylamine (0.007ml) was then added and stirring continued for a further 64h. The mixture was concentrated in vacuo and the residue dissolved in DCM (1.5ml) then treated with saturated aqueous sodium bicarbonate solution (1.5ml). This mixture was stirred for 30 min, then the layers were separated and the organic layer applied to an SPE cartridge (silica, 1g) which was eluted sequentially with a gradient of ethyl acetate: cyclohexane (1:4, then 1:2, 1:1 and 1:0). Fractions containing desired material were concentrated in vacuo to afford Example 91 (0.023g). LCMS showed $MH^+ = 396$; $T_{RET} = 3.26$ min.

Example 92: 1-Ethyl-N-(4-fluorophenyl)-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



that is, Example 92 is:

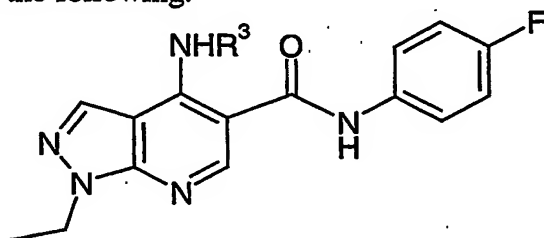


wherein $NHR^3 =$ 

Intermediate 41 (0.017g) was dissolved in DMF (2ml), then treated with HATU (0.023g) followed by diisopropylethyl amine (0.021ml) and the mixture stirred for 10 min. 4-Fluoroaniline (0.006ml) was then added and stirring continued for a further 64h. The

5 mixture was concentrated in vacuo and the residue dissolved in DCM (1.5ml) then treated with saturated aqueous sodium bicarbonate solution (1.5ml). This mixture was stirred for 30 min, then the layers were separated and the organic layer concentrated in vacuo. The crude mixture was purified by mass directed autoprep HPLC to afford Example 92 (0.013g). LCMS showed $MH^+ = 370$; $T_{RET} = 2.91$ min.

Similarly prepared were the following:

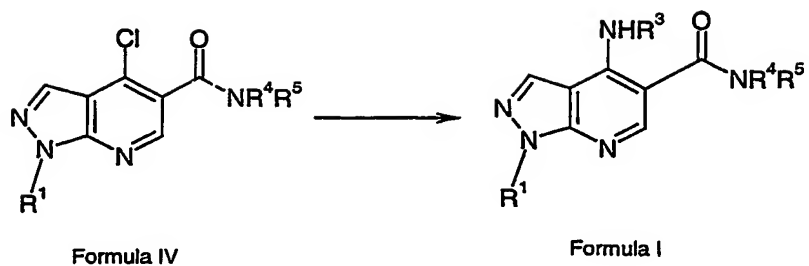


	NHR ³	Starting material	MH ⁺ ion	T _{RET} (min)
Example 93		Intermediate 42	370	2.91
Example 94		Intermediate 43	400	3.37
Example 95		Intermediate 44	386	3.27
Example 96		Intermediate 45	340	3.21
Example 97		Intermediate 46	418	2.80
Example 98		Intermediate 47	432	2.84

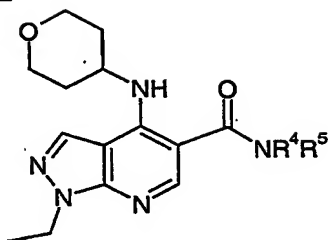
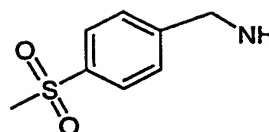
10

Example 99

15 In all of Examples 22 to 98, where a 4-amino 5-carboxamide Example of the following Formula I has been synthesised from the 4-chloro derivative, then an alternative final-step synthesis is as follows:

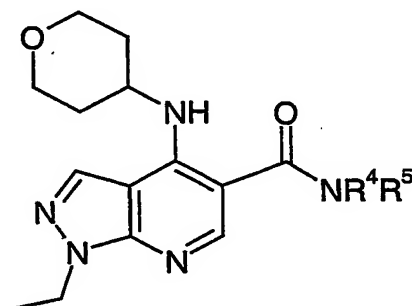


- 5 An intermediate of Formula IV above (0.1mmol) was dissolved in acetonitrile (1ml). An amine of formula R^3NH_2 (0.11mmol, 1.1 mole equivalents) and N,N-diisopropylethylamine (0.5mmol, 5 mole equivalents) were added and the mixture stirred under nitrogen at 85°C for 16h. After concentration in vacuo, the residue was partitioned between dichloromethane (DCM) and water. The layers were separated and the organic layer was concentrated in vacuo to afford an Example of Formula I.

Example 100Example 100 $\text{NR}^4\text{R}^5 =$ 

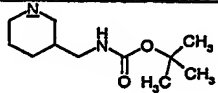
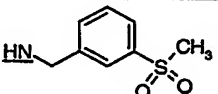
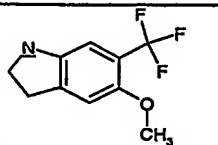
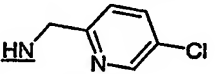
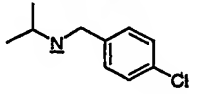
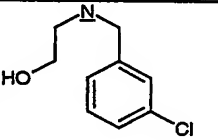
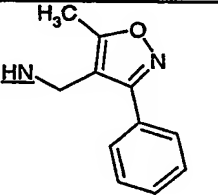
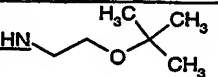
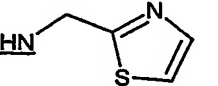
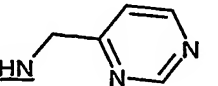
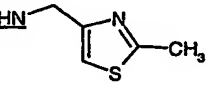
- 5 Intermediate 33 (0.048mmol) was dissolved in DMF (0.5ml), then treated with HATU (0.048mmol) followed by diisopropylethyl amine (0.096mmol) and the mixture stirred for 10 min. 4-Methylsulfonylbenzylamine (0.052mmol, available from Acros Organics) was then added and stirring continued for a further 16 hours. The mixture was concentrated *in vacuo*. The crude mixture was purified by mass directed autoprep HPLC to afford
- 10 Example 100 (0.013g). LCMS showed $\text{MH}^+ = 458$; $T_{\text{RET}} = 2.22\text{min}$.

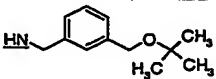
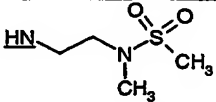
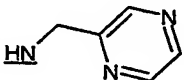
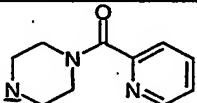
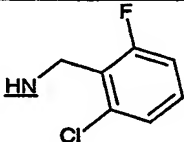
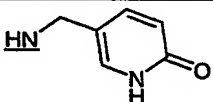
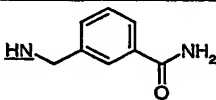
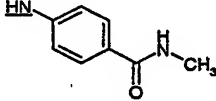
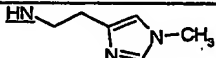
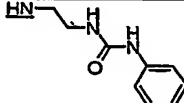
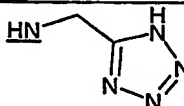
Similarly prepared, but replacing the 4-methylsulfonylbenzylamine with the same or similar number of moles of another amine $\text{R}^4\text{R}^5\text{NH}$, were the following compounds:

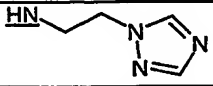
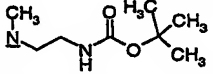
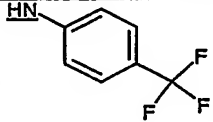
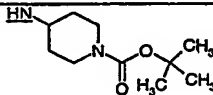
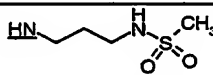
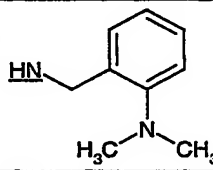
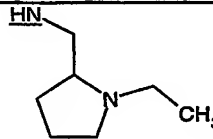
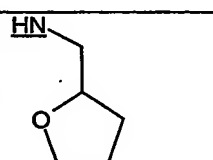
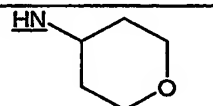
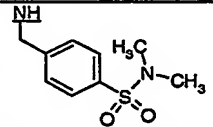
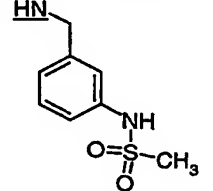


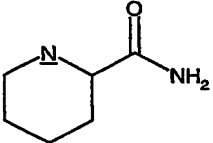
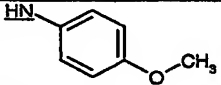
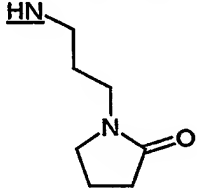
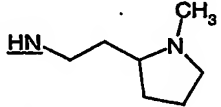
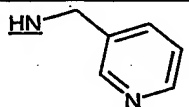
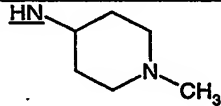
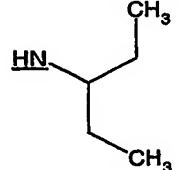
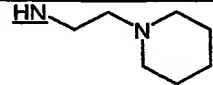
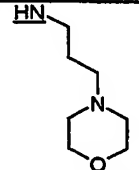

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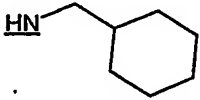
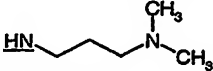
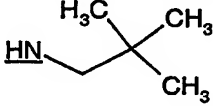
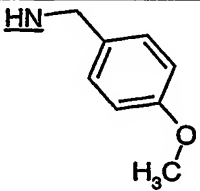
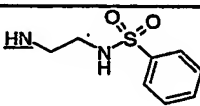
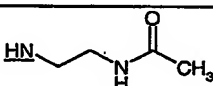
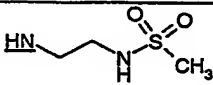
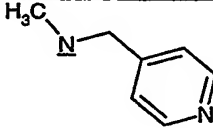
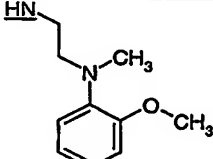
	NR^4R^5 (the N atom linking R^4 and R^5 to the -CO-pyrazolo-pyridine moiety is underlined)	Source of $\text{R}^4\text{R}^5\text{NH}$	Starting Material	MH^+ ion	T_{RET} (min)

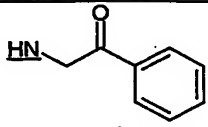
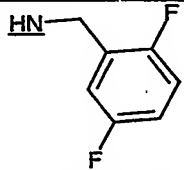
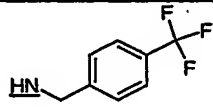
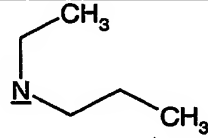
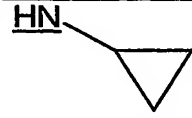
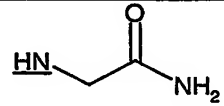
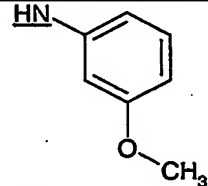
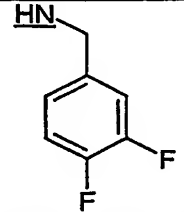
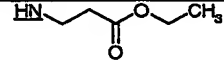
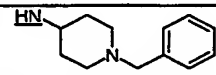
Example 101		AstaTech, Inc. 8301 Torresdale Ave. 19C, Philadelphia, PA, 19136, USA	Intermediate 33	487	2.29
Example 102		<i>J. Chem. Soc.</i> , 1945, 633	Intermediate 33	458	2.2
Example 103		WO 98/52943	Intermediate 33	490	2.66
Example 104		<i>J. Org. Chem.</i> , 1979, 44(3), 396	Intermediate 33	415	2.28
Example 105		<i>Seriya Khimicheskaya</i> , 1989, (7), 1694	Intermediate 33	456	2.65
Example 106		SALOR (Aldrich)	Intermediate 33	458	2.32
Example 107		Maybridge Chemical Company Ltd. Trevillet Tintagel Cornwall PL34 0HW United Kingdom	Intermediate 33	461	2.5
Example 108		MicroChemistry- RadaPharma Shosse Entusiastov 56 Moscow, 111123 Russia	Intermediate 33	390	2.28
Example 109		MicroChemistry- RadaPharma Shosse Entusiastov 56 Moscow, 111123 Russia	Intermediate 33	387	2.13
Example 110		<i>Bulletin des Societes Chimiques Belges</i> , (1982), 91(2), 153	Intermediate 33	382	1.98
Example 111		MicroChemistry- RadaPharma Shosse Entusiastov 56	Intermediate 33	401	2.14

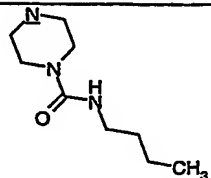
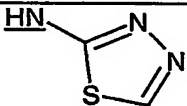
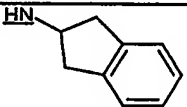
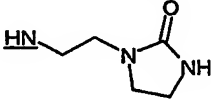
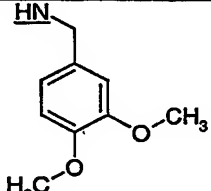
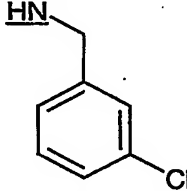
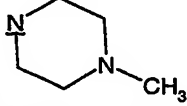
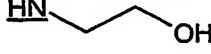
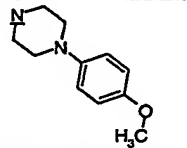
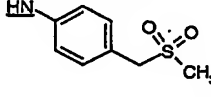
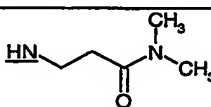
		Moscow, 111123 Russia			
Example 112			Intermediate 33	466	2.67
Example 113		Ultrafine (UFC Ltd.), see above for address	Intermediate 33	425	2
Example 114		Austin Chemical Company, Inc. 1565 Barclay Blvd. Buffalo Grove, IL, 60089 USA	Intermediate 33	382	2
Example 115		WO 02/83624	Intermediate 33	464	1.97
Example 116		Fluka Chemie AG	Intermediate 33	432	2.52
Example 117		MicroChemistry- RadaPharma Shosse Entusiastov 56 Moscow, 111123 Russia	Intermediate 33	397	1.96
Example 118		WO 02/85860	Intermediate 33	423	2.09
Example 119		Butt Park Ltd. Braysdown Works Peasedown St. John Bath, BA2 8LL, United Kingdom	Intermediate 33	423	2.19
Example 120		Sigma	Intermediate 33	398	1.77
Example 121		US 4562184	Intermediate 33	452	2.21
Example 122		Dynamit Nobel GmbH, Germany; or Saville Whittle Ltd (UK agents of Dynamit Nobel), Vickers Street,	Intermediate 33	372	1.93

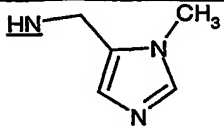
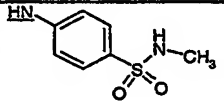
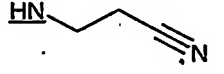
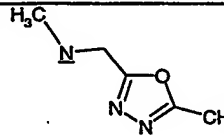
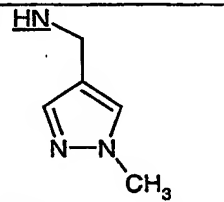
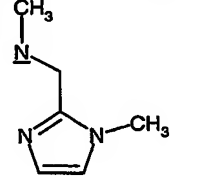
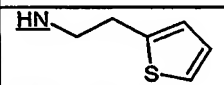
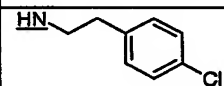
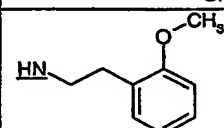
		Manchester M40 8EF, United Kingdom			
Example 123		WO 02/66470	Intermediate 33	385	1.93
Example 124		<i>J. Med. Chem.</i> , 1990, 33(1), 97	Intermediate 33	447	2.17
Example 125		Aldrich	Intermediate 33	434	2.84
Example 126		AstaTech, Inc. 8301 Torresdale Ave. 19C, Philadelphia, PA, 19136, USA	Intermediate 33	473	2.5
Example 127			Intermediate 33	425	1.99
Example 128		<i>J. Org. Chem.</i> , 2001, 66(6), 1999	Intermediate 33	423	1.97
Example 129		Acros Organics	Intermediate 33	401	1.82
Example 130		Aldrich	Intermediate 33	374	2.08
Example 131		Combi-Blocks Inc., 7949 Silverton Av., Suite 915, San Diego, CA 92126, USA (see also Intermediate 8A)	Intermediate 33	374	2.04
Example 132		<i>J. Org. Chem.</i> , 1955, 20, 1657	Intermediate 33	487	2.39
Example 133		<i>J. Med. Chem.</i> , 1999, 42(14), 2504; or variation of: Lis et al., <i>J. Med. Chem.</i> , 1990, 33(10), 2883,	Intermediate 33	473	2.24

		see Scheme III and ref. 24			
Example 134		<i>Tetrahedron</i> , 1992, 48(29), 6161	Intermediate 33	401	1.97
Example 135		Aldrich	Intermediate 33	396	2.42
Example 136		Aldrich	Intermediate 33	415	2.03
Example 137		Aldrich	Intermediate 33	401	1.78
Example 138		Aldrich	Intermediate 33	381	1.81
Example 139		MicroChemistry- RadaPharma Shosse Entusiastov 56 Moscow, 111123 Russia	Intermediate 33	387	1.74
Example 140		Aldrich	Intermediate 33	360	2.16
Example 141		Aldrich	Intermediate 33	401	1.81
Example 142		Aldrich	Intermediate 33	417	1.75
Example 143		Aldrich	Intermediate 33	376	2.16

Example 144		Aldrich; or Baruah et al., <i>Synlett</i> , 1999, 4, 409	Intermediate 33	386	2.59
Example 145		Aldrich	Intermediate 33	375	1.73
Example 146		Fluorochem Ltd. Wesley Street Old Glossop Derbyshire SK13 7RY United Kingdom	Intermediate 33	360	2.16
Example 147		Aldrich; or Acros; or Jung et al., <i>Tetrahedron Lett.</i> , 2002, 43(48), 8735; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Organic Lett.</i> , 2002, 4(12), 2055	Intermediate 33	410	2.4
Example 148		Berk Univar plc Berk House P.O.Box 56 Basing View Basingstoke Hants RG21 2E6, United Kingdom	Intermediate 33	473	2.26
Example 149		Aldrich	Intermediate 33	375	1.9
Example 150		MicroChemistry-RadaPharma Shosse Entusiastov 56 Moscow, 111123 Russia	Intermediate 33	411	1.95
Example 151		Array Biopharma Inc. 1885 33rd Street Boulder, CO 80301 USA	Intermediate 33	395	1.73
Example 152		<i>Nippon Kagaku Zasshi.</i> , 1960, 81 p.962.	Intermediate 33	453	1.96

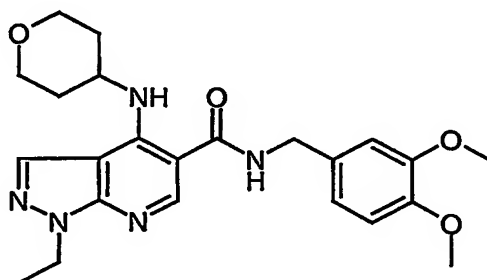
Example 153		Aldrich	Intermediate 33	408	2.35
Example 154		Aldrich	Intermediate 33	416	2.5
Example 155		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	448	2.68
Example 156		Alfa Aesar, A Johnson Matthey Company 30 Bond Street Ward Hill, MA 01835-8099 USA	Intermediate 33	360	2.16
Example 157		Aldrich	Intermediate 33	330	2.04
Example 158		Aldrich	Intermediate 33	347	1.83
Example 159		Aldrich	Intermediate 33	396	2.49
Example 160		Aldrich	Intermediate 33	416	2.53
Example 161		Aldrich	Intermediate 33	390	2.18
Example 162		Aldrich	Intermediate 33	463	1.96

Example 163		US 4987132	Intermediate 33	458	2.13
Example 164		Aldrich	Intermediate 33	374	2.22
Example 165		Aldrich; or TCI-America; or Maybridge-Int.	Intermediate 33	406	2.53
Example 166		Maybridge Chemical Company Ltd. Trevillett Tintagel Cornwall PL34 0HW United Kingdom	Intermediate 33	402	1.93
Example 167		Aldrich; or Baruah et al., <i>Synlett</i> , 1999, 4, 409	Intermediate 33	440	2.3
Example 168		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	414	2.58
Example 169		Aldrich	Intermediate 33	373	1.64
Example 170		Aldrich	Intermediate 33	334	1.85
Example 171		Aldrich	Intermediate 33	465	2.29
Example 172		EP 666258	Intermediate 33	458	2.25
Example 173		<i>J. Chem. Soc.</i> , 1954, 1171	Intermediate 33	389	1.98

Example 174		Peakdale Molecular Ltd, Peakdale Science Park, Sheffield Road, Chapel-en-le-Frith, High Peak SK23 0PG, United Kingdom	Intermediate 33	384	1.76
Example 175		Fluorochem Ltd. Wesley Street Old Glossop Derbyshire SK13 7RY United Kingdom	Intermediate 33	459	2.36
Example 176		Lancaster Synthesis Ltd, Newgate, White Lund, Morecambe, Lancashire LA3 3DY, United Kingdom	Intermediate 33	343	2.01
Example 177		ChemBridge Europe, 4 Clark's Hill Rise, Hampton Wood, Evesham, Worcestershire WR11 6FW, United Kingdom	Intermediate 33	400	1.92
Example 178		TimTec, Inc. P O Box 8941 Newark, DE, 19714-8941 USA	Intermediate 33	384	2.03
Example 179		ChemBridge Europe, 4 Clark's Hill Rise, Hampton Wood, Evesham, Worcestershire WR11 6FW, United Kingdom	Intermediate 33	398	1.70
Example 180		Aldrich	Intermediate 33	400	2.41
Example 181		Aldrich	Intermediate 33	428	2.61
Example 182		Aldrich	Intermediate 33	424	2.49

Example 167: *N*-{[3,4-Bis(methoxy)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide

5

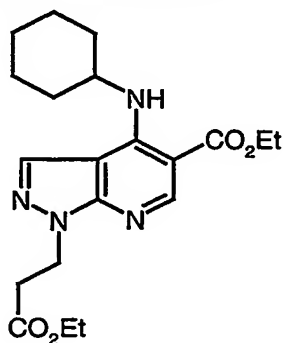


In an alternative embodiment to the process described above for Examples 100-182, Example 167 can be made according to the following method:

- 10 A mixture of Intermediate 33 (0.498g, 1.72mmol), EDC (0.46g, 2.41mmol), and HOBt (0.278g, 1.68mmol) was stirred at room temperature for 0.25 hours. Veratrylamine (3,4-dimethoxybenzylamine, 0.31ml, 2.05mmol, obtainable from Aldrich or *Synlett*, 1999, 4, 409) was added, and stirring was continued at room temperature for 22 hours. The reaction mixture was partitioned between Et₂O and water. The aqueous phase was
- 15 extracted with Et₂O and the combined organic phases washed with brine, dried (MgSO₄) and evaporated *in vacuo*. The residue was purified by chromatography (Biotage, silica 40g) eluting with EtOAc : cyclohexane (2:1). The material was further purified by SPE (SCX-2, 10g) eluting with methanol then ammonia in methanol (0.5M). The ammonia methanol fractions were combined and evaporated *in vacuo* to afford Example 167 as a
- 20 white foam (0.633g). LCMS showed MH⁺ = 440; T_{RET} = 2.65min. ¹H NMR (400MHz in CDCl₃, 27°C, δppm) 9.78 (d, 1H) 8.37 (s, 1H) 7.94 (s, 1H) 6.94 - 6.82 (m, 3H) 6.29 (br m, 1H) 4.56 (d, 2H) 4.46 (q, 2H) 4.15-4.01 (m's, 3H) 3.89 (s, 6H) 3.63 (m, 2H) 2.15 (m, 2H) 1.78 (m, 2H) 1.49 (t, 3H).

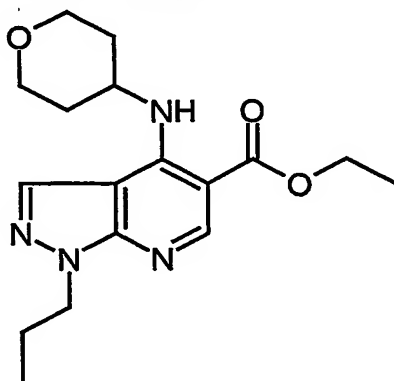
25

Example 183: Ethyl 4-(cyclohexylamino)-1-(3-ethoxy-3-oxopropyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate



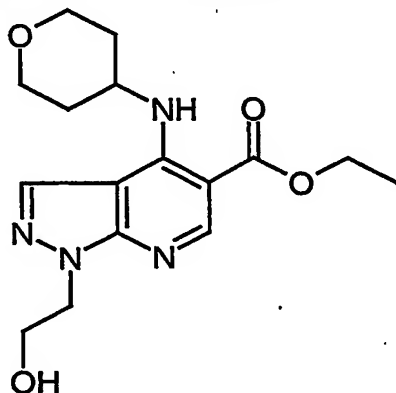
A vigorously stirred mixture of Intermediate 48 (40mg), anhydrous potassium carbonate (57mg) and ethyl 3-bromopropanoate (0.027ml) in anhydrous DMF (1ml) was heated at 65 °C overnight. The reaction mixture was concentrated, and the residue was partitioned between dichloromethane (5ml) and water (5ml). The phases were separated and the organic phase was evaporated to a residual oil which was purified by mass directed autoprep HPLC to afford Example 183 (5mg). LCMS showed $MH^+ = 389$; $T_{RET} = 3.65$ min.

Example 185: Ethyl 1-n-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



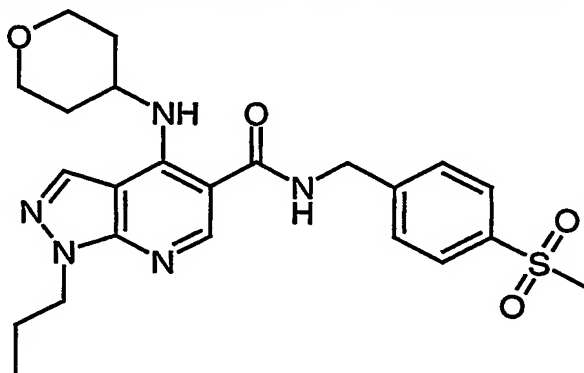
Sodium hydride (0.067g, 60% dispersion in oil) was added to a stirred solution of Example 20 (0.47g) in DMF (19ml), followed by n-propyl iodide (0.17ml). The mixture was stirred at 23 °C for 16 hours, then concentrated, diluted with chloroform (30ml) and washed with 1:1 water:brine solution (30ml), separated and the organic layer concentrated. The residue was purified on a SPE cartridge (silica, 10g) eluting with 10ml volumes of dichloromethane, 1:1 diethyl ether:cyclohexane, and diethyl ether. The combined 1:1 diethyl ether: cyclohexane, and diethyl ether, fractions were concentrated to give Example 185 as a clear gum (0.23g). LCMS showed $MH^+ = 333$; $T_{RET} = 3.14$ min.

Example 186: Ethyl 1-(2-hydroxyethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



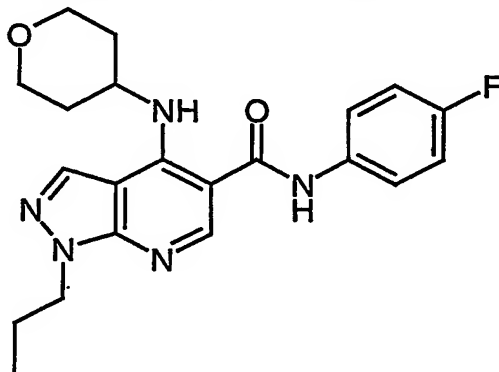
2-Bromoethanol (0.008ml) was added to a solution of Example 20 (0.03g) in anhydrous DMF (1.5ml), with 2-tert-butylimino-2-diethylamino-1,3-dimethyl-perhydro-1,3,2-diazaphosphorine (polymer bound, 2.3mmol/g loading, 0.045g). The mixture was shaken at 23 °C for 16 hours, then the solution drained from the resin, and the resin was washed with DMF. The combined organics were concentrated, and the residue purified on a SPE cartridge (silica, 1g) eluting with 70-100% ethyl acetate in cyclohexane. The combined fractions were concentrated to give Example 186 as a white solid (0.011g). LCMS showed $MH^+ = 335$; $T_{RET} = 2.47$ min.

Example 187: *N*-[4-(Methylsulfonyl)benzyl]-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



Intermediate 50 (0.03g) was stirred in DMF (1ml) with DIPEA (0.035ml) and HATU (0.038g) for 20 min. 4-(Methylsulfonyl)benzylamine hydrochloride (0.024g) was added to the mixture and the solution was stirred for 8 hours at 23 °C. The solution was concentrated and the residue dissolved in dichloromethane (6ml) then washed with saturated sodium bicarbonate solution (6ml) and 1:1 brine:water (6ml), separated by hydrophobic frit. The organic layer was concentrated to give Example 187 as a white solid (0.039g). LCMS showed $MH^+ = 472$; $T_{RET} = 2.67$ min.

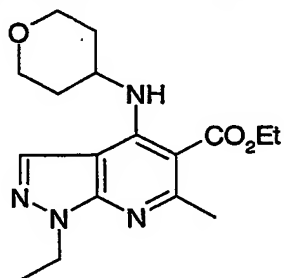
Example 188: *N*-(4-Fluorophenyl)-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



The synthetic method is as described in Example 187, except that in place of 4-(methylsulfonyl)benzylamine hydrochloride, 4-fluoroaniline (0.01ml) was added to the

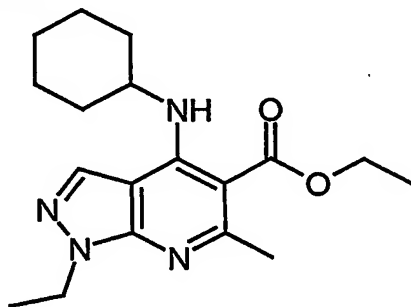
mixture. The resultant product required further purification, which was performed by mass directed autoprep HPLC, giving Example 188 as a clear gum (0.03g). LCMS showed $MH^+ = 398$; $T_{RET} = 3.13\text{min}$.

5 **Example 189:** Ethyl 1-ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



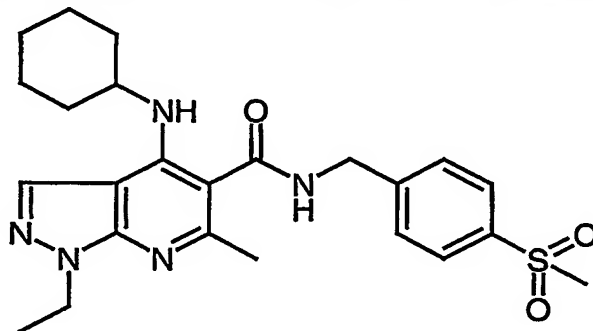
10 4-Aminotetrahydropyran hydrochloride (Intermediate 8A, 0.413g, 3.0mmol) was added to a mixture of Intermediate 51 (0.268g, 1.0mmol) and N,N-diisopropylethylamine (0.87ml, 5.0mmol) in acetonitrile (3ml). The resulting mixture was heated at 85 °C for 24 hours. Volatiles were removed *in vacuo* and the residue was dissolved in chloroform (1.5ml) and applied to a SPE cartridge (silica, 5g). The cartridge was eluted successively with Et₂O, EtOAc and EtOAc-MeOH (9/1). Fractions containing the desired product were combined and concentrated *in vacuo* to give the desired product contaminated with
15 starting material (Intermediate 51). Further purification using a SPE cartridge (silica, 5g) eluting with ethyl acetate-cyclohexane (1/3) afforded Example 189 (0.248g). LCMS showed $MH^+ = 333$; $T_{RET} = 2.75\text{min}$.

20 **Example 190:** Ethyl 4-(cyclohexylamino)-1-ethyl-6-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



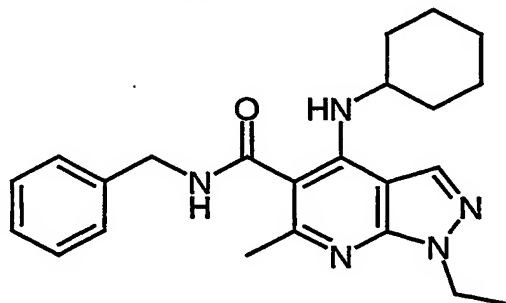
25 Cyclohexylamine (0.149g, 1.5mmol) was added to a mixture of Intermediate 51 (0.201g, 0.75mmol) and N,N-diisopropylethylamine (0.65ml, 3.73mmol) in acetonitrile (3ml). The resulting mixture was heated at 85 °C for 40 hours. Volatiles were removed *in vacuo* and the residue was dissolved in chloroform (1.5ml) and applied to a SPE cartridge (silica, 5g). The cartridge was eluted successively with Et₂O, EtOAc and MeOH. Fractions containing the desired product were combined and concentrated *in vacuo* to afford Example 190 (0.128g). LCMS showed $MH^+ = 331$; $T_{RET} = 3.64\text{min}$.

Example 191: 4-(Cyclohexylamino)-1-ethyl-6-methyl-N-[4-(methylsulfonyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



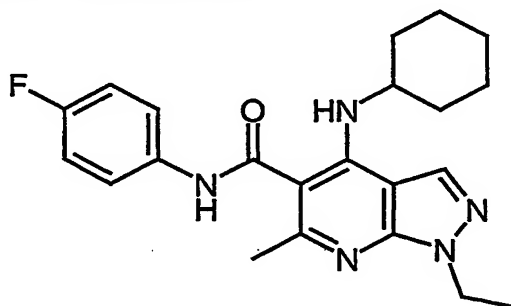
- A mixture of Intermediate 52 (0.014g, 0.046mmol), HATU (0.018g, 0.048mmol) and
5 DIPEA (0.022ml, 0.125mmol) in DMF (1ml) was shaken at room temperature for 10min.
1-[4-(Methylsulfonyl)phenyl]methanamine (0.009g, 0.046mmol) was then added, and the
mixture was shaken for several minutes to give a solution. This solution was stored at
room temperature for 16 hours. The solution was concentrated *in vacuo*, and the residue
was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g).
10 The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and
EtOAc-MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated
in vacuo to afford Example 191 (0.005g). LCMS showed $MH^+ = 470$; $T_{RET} = 2.54$ min.

Example 192: *N*-Benzyl-4-(cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



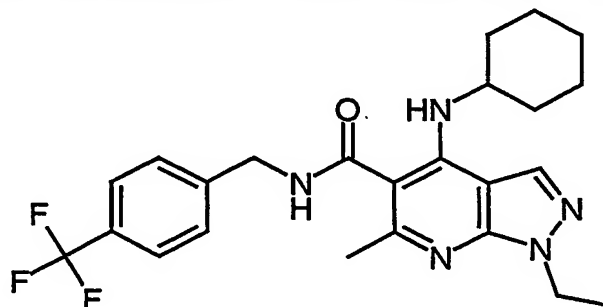
5 Example 192 was prepared from Intermediate 52 using a method analogous to Example 191. LCMS showed $MH^+ = 392$; $T_{RET} = 2.43$.

Example 193: 4-(Cyclohexylamino)-1-ethyl-*N*-(4-fluorophenyl)-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



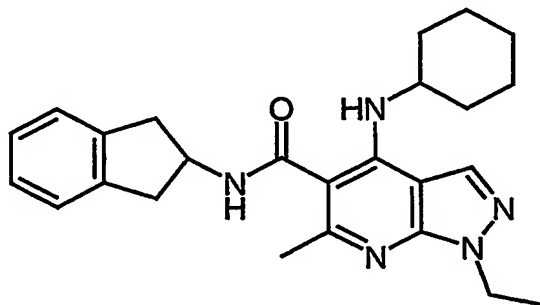
10 Example 193 was prepared from Intermediate 52 using an analogous method to Example 191. LCMS showed $MH^+ = 396$; $T_{RET} = 2.6$ min.

Example 194: 4-(Cyclohexylamino)-1-ethyl-6-methyl-*N*-[4-(trifluoromethyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



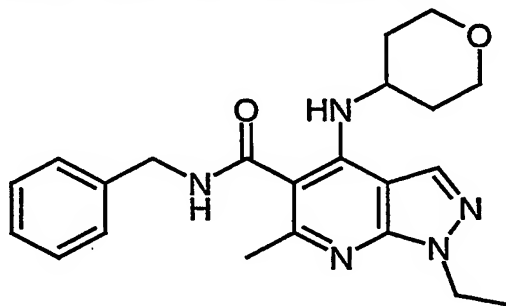
15 Example 194 was prepared from Intermediate 52 using an analogous method to Example 191. LCMS showed $MH^+ = 460$; $T_{RET} = 2.74$ min.

Example 195: 4-(Cyclohexylamino)-*N*-(2,3-dihydro-1*H*-inden-2-yl)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



5 Example 195 was prepared from Intermediate 52 using an analogous method to Example 191. LCMS showed $MH^+ = 418$; $T_{RET} = 2.55$ min.

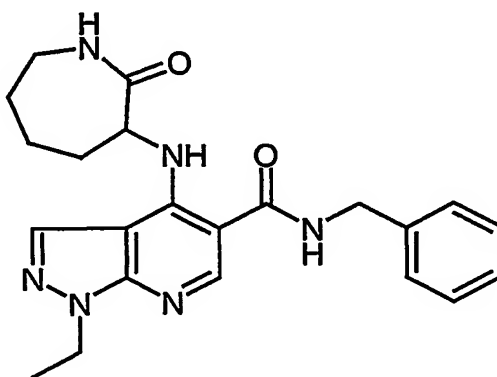
Example 196: *N*-Benzyl-1-ethyl-6-methyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



10 Example 196 was prepared from Intermediate 53 using an analogous method to Example 191. LCMS showed $MH^+ = 394$; $T_{RET} = 2.02$ min.

Example 197: *N*-Benzyl-1-ethyl-4-[(2-oxoazepan-3-yl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide

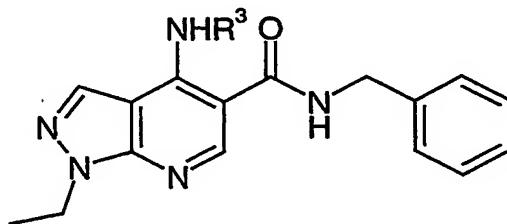
15



20 3-Aminoazepan-2-one (0.043g, 0.335mmol, commercially available from Sigma-Aldrich Company Ltd) was added to a mixture of Intermediate 17 (0.021g, 0.067mmol) and DIPEA (0.058ml, 0.335mmol) in acetonitrile (0.5ml). The resulting mixture was heated at

85 °C for 48 hours. Volatiles were removed in vacuo, and the residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (silica, 0.5g) which was eluted successively with diethyl ether (1.5ml), ethyl acetate (1.5ml) and ethyl acetate-methanol (9/1, 1.5ml). Fractions containing the desired material were concentrated in vacuo to afford Example 197 (0.009g). LCMS showed $MH^+ = 407$; $T_{RET} = 2.81$ min.

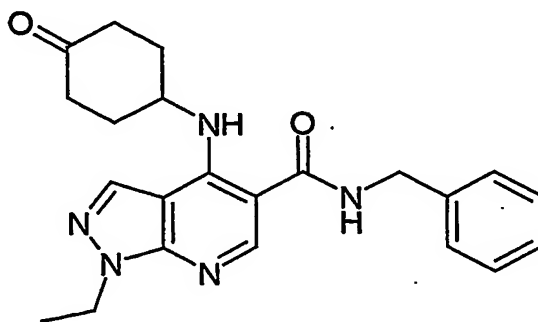
Similarly prepared, but replacing the 3-aminoazepan-2-one with the same or similar number of moles of another amine R^3NH_2 were the following compounds:



10

Example Number	NHR^3	Source of R^3NH_2	Starting Material	MH^+ ion	T_{RET} (min)
Example 198		<i>J. Chem. Soc., Perkin Trans. 1</i> ; 1994, 537	Intermediate 17	394	2.75
Example 199		Aldrich; or TCI-America	Intermediate 17	394	2.82
Example 200		US 4219660	Intermediate 17	380	2.70

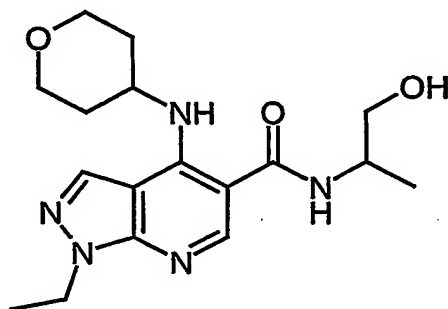
Example 201: *N*-Benzyl-1-ethyl-4-[(4-oxocyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



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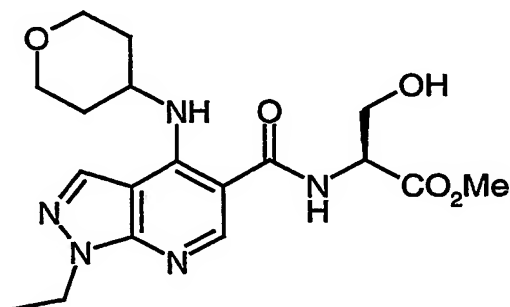
Intermediate 54 (0.048g, 0.32mmol) was added to a mixture of Intermediate 17 (0.050g, 0.16mmol) and DIPEA (0.17ml, 0.98mmol) in acetonitrile (3ml). The resulting mixture was heated under reflux. After 12 hours, further quantities of Intermediate 54 (0.044g, 0.29mmol), DIPEA (0.17ml, 0.98mmol) and acetonitrile (1ml) were added to reaction mixture which was maintained under reflux. After 36 hours, the reaction mixture was concentrated in vacuo, and the residual oil was dissolved in dichloromethane (8ml) and washed with 5% sodium bicarbonate solution (2ml). Evaporation of the organic solution gave a viscous oil which was dissolved in dichloromethane (2ml) and applied to a SPE cartridge (silica, 5g). The cartridge was eluted successively with a gradient of ethyl acetate-cyclohexane (1:16, then 1:8, 1:4, 1:2, 1:1 and 1:0). Fractions containing the desired material were concentrated in vacuo to afford Example 201 (0.018g). LCMS showed $MH^+ = 392$; $T_{RET} = 2.95min$.

Example 202: 1-Ethyl-N-(2-hydroxy-1-methylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

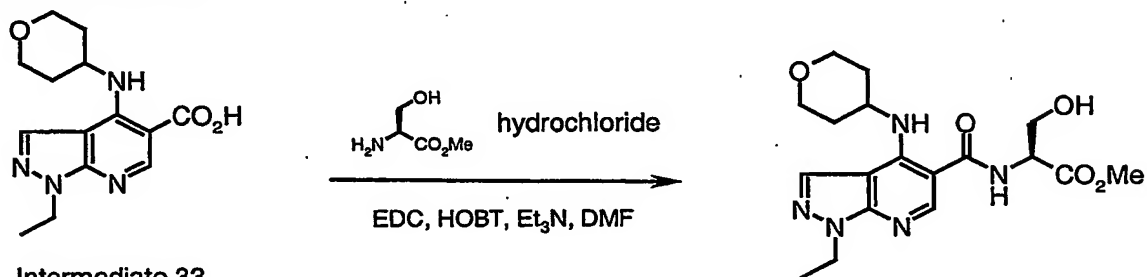


Intermediate 33 (0.1g, 0.34mmol), EDC (0.066g, 0.34mmol) and HOBT (0.05g, 0.37mmol) were suspended in DMF (2ml) and stirred at room temperature under nitrogen for 15 min. 2-aminopropan-1-ol (0.026g, 0.34mmol) and triethylamine (0.036g, 0.36mmol) were added and the mixture was stirred at room temperature under nitrogen for 6 hours. Solvents were removed in vacuo and the residue partitioned between DCM and water. The organic layer was concentrated and applied to an SPE cartridge (aminopropyl, 5g), which was eluted with methanol. Concentration in vacuo afforded Example 202 (0.095g). LCMS showed $MH^+ = 348$, $T_{RET} = 2.15min$.

Example 203: Methyl (2*S*)-2-([1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl)amino)-3-hydroxypropanoate

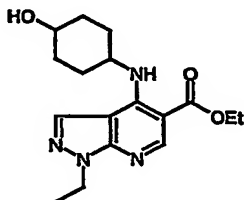


5 **Reaction scheme:**

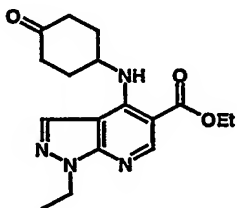


Intermediate 33

Intermediate 33 (0.1g, 0.34mmol), EDC (0.066g, 0.34mmol) and HOBT (0.05g, 0.37mmol) were suspended in DMF (2ml) and stirred at room temperature under nitrogen for 15 mins. L-Serine methyl ester hydrochloride (0.054g, 0.34mmol) and triethylamine (0.036g, 0.36mmol) were added and the mixture stirred at room temperature under nitrogen for 18 hours. Solvents were removed in vacuo and the residue was partitioned between DCM and water. The organic layer was concentrated in vacuo and applied to an SPE cartridge (aminopropyl, 5g), which was eluted with methanol. Concentration in vacuo afforded an impure residue which was further purified by SPE cartridge (silica, 5g), eluting with ethyl acetate followed by 5% methanol/ethyl acetate. The desired fractions were concentrated in vacuo to afford Example 203 (0.055g). LCMS showed $MH^+ = 393$; $T_{RET} = 2.22$ min.

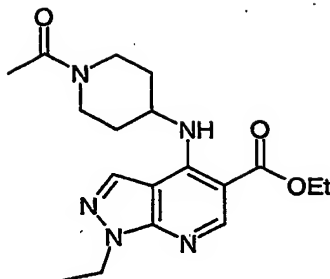
Example 204 Ethyl 1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

Intermediate 1 (1.5g, 5.9mmol) was dissolved in acetonitrile (80ml). Trans-4-aminocyclohexanol (0.817g, 7.1mmol, commercially available from TCI-America; alternatively (e.g. as the HCl salt) from Aldrich) and diisopropylethylamine (6.18ml, 35.5mmol) were added and the mixture was stirred at 85°C for 16h. The mixture was concentrated *in vacuo*, and the residue was partitioned between DCM (120ml) and water (30ml). The phases were separated and the organic phase was dried (Na₂SO₄) and evaporated to give a pale yellow solid. The solid was dissolved in a mixture of DCM (10ml) and chloroform (3ml), and applied in equal portions to two SPE cartridges (silica, 20g) which were eluted sequentially with a gradient of EtOAc:cyclohexane (1:16, then 1:8, 1:4, 1:2, 1:1 and 1:0). Fractions containing the desired material were combined and evaporated *in vacuo* to give Example 204 (1.893g) as a white solid. LCMS showed MH⁺ = 333; T_{RET} = 2.79min.

Example 205: Ethyl 1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate

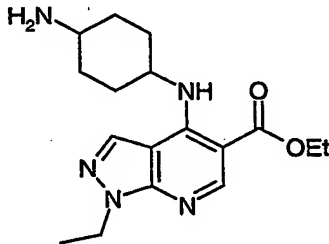
Example 204 (1.893g, 5.7mmol) was suspended in acetone (12ml) and the stirred suspension was treated at 0°C with Jones reagent (1.81ml). After 30min, a further quantity of Jones reagent (1.81ml) was added to the reaction mixture which was maintained at 0°C. After a further 2h, a final portion of Jones reagent (1.44ml) was added to the reaction mixture, and stirring at 0°C was continued for 1h. Isopropanol (3.8ml) was added to the reaction mixture, followed by water (15ml). The resulting mixture was extracted with ethyl acetate (2 x 40ml). The combined organic extracts were washed with water (8ml), dried (Na₂SO₄) and evaporated to a grey solid. The solid was dissolved in DCM (10ml) and applied in equal portions to two SPE cartridges (silica, 20g) which were eluted sequentially with a gradient of ethyl acetate:cyclohexane (1:16, then 1:8, 1:4, 1:2, and 1:1). Fractions containing the desired material were combined and evaporated *in vacuo* to give Example 205 (1.893g) as a white solid. LCMS showed MH⁺ = 331; T_{RET} = 2.84min.

Example 207: Ethyl 4-[(1-acetyl-4-piperidiny)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



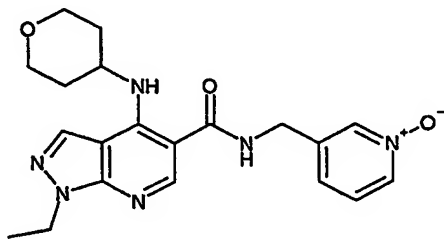
Intermediate 1 (2.58g), Intermediate 6 (2.0g) and N,N-diisopropylethylamine (8.9ml) were dissolved in acetonitrile (98ml). The reaction mixture was heated at 85 °C for 24h then an additional portion of Intermediate 6 (0.18g) was added and heating continued for a further 10h. The reaction was concentrated in vacuo and the residues partitioned between DCM and water. The phases were separated and the organic phase evaporated in vacuo. The residue was purified by chromatography using Biotage (silica 90g) eluting with DCM : MeOH (5%) to afford Example 207 (1.55g) as a white solid. LCMS showed MH^+ 360; T_{RET} = 2.71 min.

Example 209: Ethyl 4-[(4-aminocyclohexyl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



Example 209 was prepared from Intermediate 1 and (4-aminocyclohexyl)amine using an analogous method to that used for the preparation of Example 207. LCMS showed MH^+ = 332; T_{RET} = 2.18min

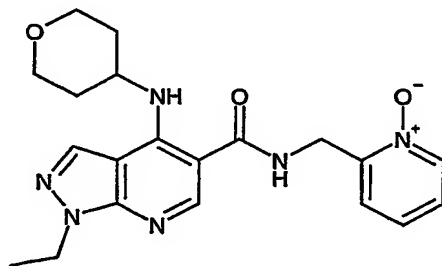
Example 210: 1-Ethyl-N-[(1-oxido-3-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide.



A solution of *meta*-chloroperoxybenzoic acid (45mg, 0.26mmol) in chloroform (1ml) was added dropwise at 0 °C to a stirred solution of Example 138 (0.1g, 0.26mmol) in chloroform (1.5ml). After 1.5h at 0 °C, a further quantity of *meta*-chloroperoxybenzoic acid (45mg, 0.26mmol) in chloroform (1ml) was added, and stirring was continued at 0 °C for 1.5h. A trace of starting material remained, so an additional quantity of *meta*-

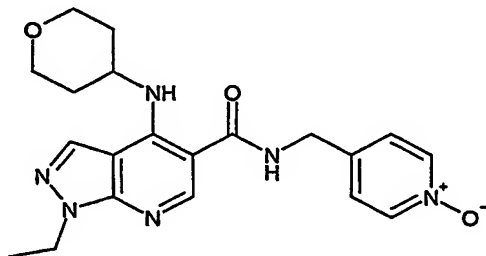
chloroperoxybenzoic acid (22mg, 0.13mmol) in chloroform (0.6ml) was added. After 3.5h at 0°C, 2M sodium carbonate solution (1ml), was added to the reaction mixture. The phases were separated by passage through a hydrophobic frit and the aqueous phase was extracted with more chloroform (2ml). The combined organic extracts were evaporated to a residual foam which was purified by mass directed autoprep HPLC to afford Example 210 (44mg). LCMS showed $MH^+ = 397$; $T_{RET} = 2.13$ min.

Example 211: 1-Ethyl-N-[(1-oxido-2-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



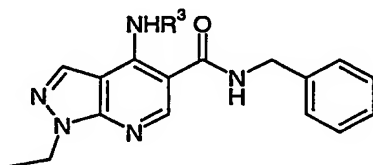
Example 211 was prepared from Example 600 using an analogous method to that used for the preparation of Example 210. LCMS showed $MH^+ = 397$; $T_{RET} = 2.20$ min

Example 212: 1-Ethyl-N-[(1-oxido-4-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



Example 212 was prepared from Example 33 using an analogous method to that used for the preparation of Example 210. LCMS showed $MH^+ = 397$; $T_{RET} = 2.13$ min

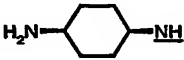

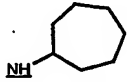
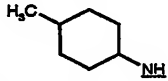
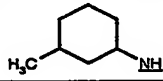

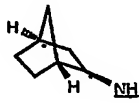
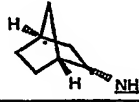
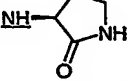
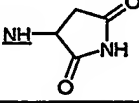
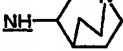
Examples 214 to 230



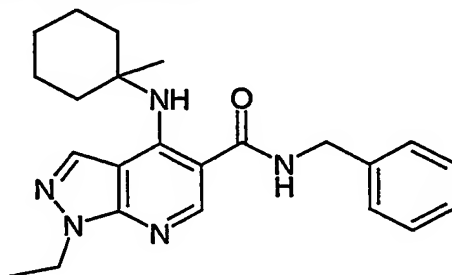
General Procedure

Intermediate 17 (0.15mmol) was treated with an aliquot of the amine (0.95ml, equivalent to 0.19mmol) from a stock solution in acetonitrile (0.2M) and N,N-diisopropylethylamine (0.24mmol). The mixture was heated at reflux for 20h then

concentrated in vacuo. The residue was purified by SPE (silica) to give the desired product.

Example no.	NHR ³	Source of R ³ NH ₂	Starting Material	MH + ion	LC-MC Retention time
214		<i>J. Med. Chem.</i> , 1994, 37(17), 2360	Intermediate 17	393	2.16
221		Aldrich	Intermediate 17	350	3.18
222		Aldrich	Intermediate 17	392	3.62
223		Aldrich	Intermediate 17	392	3.63, 3.68
224		Pfaltz-Bauer	Intermediate 17	392	3.61, 3.66
225		<i>J. Org. Chem.</i> , 1985, 50(11), 1859	Intermediate 17	392	3.54
226		Aldrich	Intermediate 17	390	3.56
227		Aldrich	Intermediate 17	390	3.52
228		WO 99/12933	Intermediate 17	379	2.66
229		EP 1188744	Intermediate 17	393	2.58
230		Aldrich	Intermediate 17	405	2.19

Example 225: 1-ethyl-4-[(1-methylcyclohexyl)amino]-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide

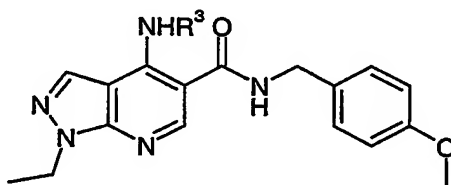


A preferred method for the preparation of Example 225 involving 1-methylcyclohexylamine and a longer reaction time is as follows:

A solution of Intermediate 17 (46mg), 1-methylcyclohexylamine (26mg) and diisopropylethylamine (94mg) in acetonitrile (1ml) was stirred and heated at reflux for 77h. More 1-methylcyclohexylamine (102mg), diisopropylethylamine (93mg) and acetonitrile (1ml) were added and the reaction mixture was heated at reflux for a further 68h. The solution was cooled and concentrated *in vacuo*. The residue was triturated in ethyl acetate and filtered. The filtrate was purified by mass directed autoprep. HPLC to give Example 225 (19mg). LCMS showed $MH^+ = 392$; $T_{RET} = 3.46$ min.

Examples 231, 247 and 257, shown below and also involving 1-methylcyclohexylamine, can also preferably be prepared in a similar manner.

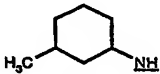
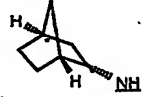
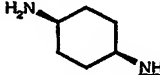
Examples 231 - 239



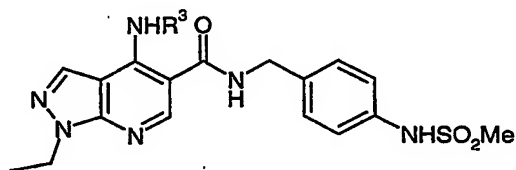
General Procedure

Intermediate 55 (0.15mmol) was treated with an aliquot of the amine (0.95ml, equivalent to 0.19mmol) from a stock solution in acetonitrile (0.2M) and N, N-diisopropylethylamine (0.24mmol). The mixture was heated at reflux for 20h then concentrated in vacuo. The residue was purified by SPE (silica) to give the desired product.

Example no.	NHR ³	Source of R ³ NH ₂	Starting Material	MH + ion	LC-MC Retention time
231		<i>J. Org. Chem.</i> , 1985, 50(11), 1859	Intermediate 55	422	3.43
233		Aldrich	Intermediate 55	380	3.20
234		Aldrich	Intermediate 55	422	3.58
235		Aldrich	Intermediate 55	420	3.52
236		Aldrich	Intermediate 55	422	3.57, 3.64

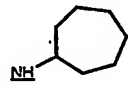
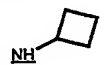
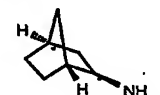

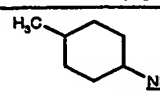
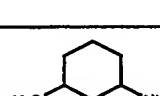
237		Pfaltz-Bauer	Intermediate 55	422	3.56,3.62
238		Aldrich	Intermediate 55	420	3.48
239		<i>J. Med. Chem.</i> , 1994, 37(17), 2360	Intermediate 55	423	2.16

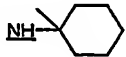
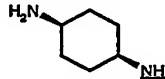
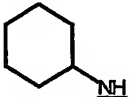
Examples 240 - 249



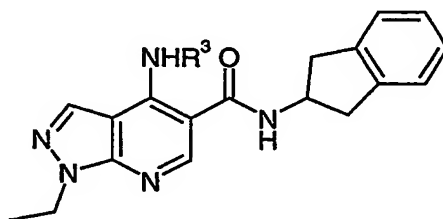
General Procedure

Intermediate 56 (0.15mmol) was treated with an aliquot of the amine (0.95ml, equivalent to 0.19mmol) from a stock solution in acetonitrile (0.2M) and *N,N*-diisopropylethylamine (0.24mmol). The mixture was heated at reflux for 20h then concentrated in vacuo. The residue was purified by SPE (silica) to give the desired product.

Example no.	NHR ³	Source of NH ₂ R ³	Starting Material	MH + ion	LC-MC Retention time
240		Aldrich	Intermediate 56	485	3.26
241		Aldrich	Intermediate 56	443	2.94
242		Aldrich	Intermediate 56	483	3.20
243		Aldrich	Intermediate 56	483	3.14
244		Aldrich	Intermediate 56	485	3.25,3.33
245		Pfaltz-Bauer	Intermediate 56	485	3.24,3.31

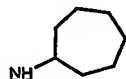

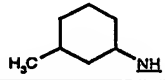
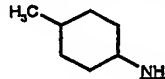
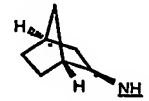
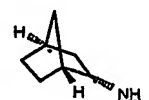
247		<i>J. Org. Chem.</i> , 1985, 50(11), 1859	Intermediate 56	483	3.10
248		<i>J. Med. Chem.</i> , 1994, 37(17), 2360	Intermediate 56	486	2.05
249		Aldrich	Intermediate 56	471	3.21


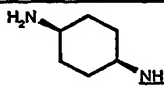
Examples 250 - 258



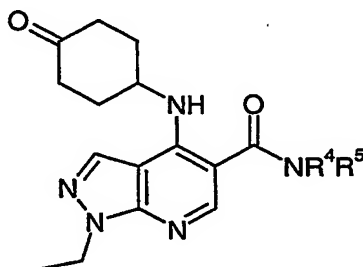
General Procedure

Intermediate 57 (0.15mmol) was treated with an aliquot of the amine (0.95ml, equivalent to 0.19mmol) from a stock solution in acetonitrile (0.2M) and N, N-diisopropylethylamine (0.24mmol). The mixture was heated at reflux for 20h then concentrated in vacuo. The residue was purified by SPE (silica) to give the desire product.

Example no.	NHR ³	Source of NH ₂ R ³	Starting Material	MH + ion	LC-MC Retention time
250		Aldrich	Intermediate 57	418	3.78
251		Aldrich	Intermediate 57	376	3.42
253		Pfaltz-Bauer	Intermediate 57	418	3.78,3.84
254		Aldrich	Intermediate 57	418	3.82,3.86
255		Aldrich	Intermediate 57	416	3.66
256		Aldrich	Intermediate 57	416	3.77

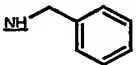
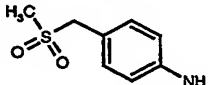
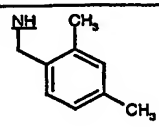
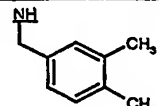
257		<i>J. Org. Chem.</i> , 1985, 50(11), 1859	Intermediate 57	418	3.74
258		<i>J. Med. Chem.</i> , 1994, 37(17), 2360	Intermediate 57	419	2.38

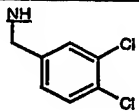
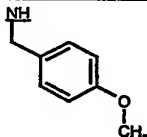
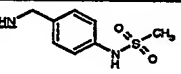
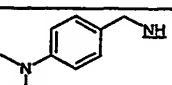
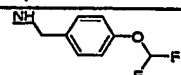
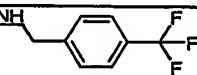
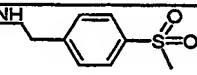
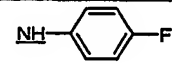
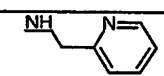
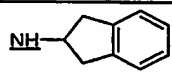
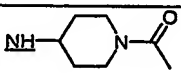
Examples 259 - 275

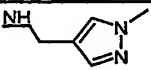

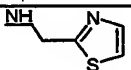


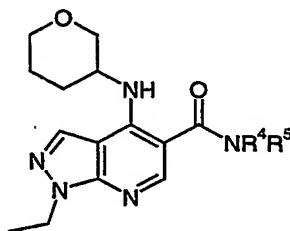
General Procedure

A mixture of Intermediate 58 (0.1mmol), HATU (0.1mmol) and DIPEA (0.4mmol) in DMF (0.4ml) was shaken at room temperature for 10 min. A solution of the amine (0.1mmol) in DMF (0.2ml) was then added and the mixture agitated for several minutes to give a solution. The solution was stored at room temperature for 16 hours then concentrated *in vacuo*. The residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g). The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and EtOAc:MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated *in vacuo* and the residue purified by mass directed autoprep HPLC.

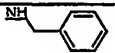
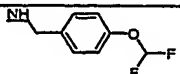
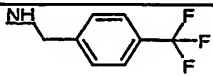
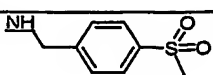
Example no.	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
201		Aldrich	Intermediate 58	392	2.60
259		EP 666258	Intermediate 58	470	2.44
260		Salor; or ICN Biomedicals, Inc.; or <i>Synthesis</i> , 1982, 12, 1036	Intermediate 58	420	3.09
261		CHMSRV-AS; or Matrix Scientific; or <i>Chem. Ber.</i> , 1969, 102, 2770	Intermediate 58	420	3.09

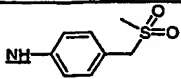
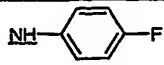
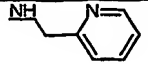
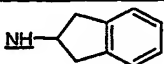
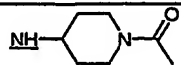
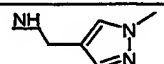

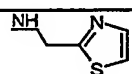
262		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 58	454	3.20
263		Acros; or Aldrich; <i>Tetrahedron Lett.</i> , 2002, 43(48), 8735; or <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 58	422	2.86
264		Lis et al., <i>J. Med. Chem.</i> , 1990, 33(10), 2883; see Scheme III and ref. 24	Intermediate 58	485	2.64
265		Aldrich	Intermediate 58	435	2.54
266		Fluorochem; or WO 98/45268	Intermediate 58	458	2.81
267		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 58	460	2.96
268		Peakdale	Intermediate 58	470	2.39
269		Aldrich	Intermediate 58	396	2.80
270 (as CF ₃ CO ₂ H salt)		Aldrich	Intermediate 58	393	1.89
271		TCI-America; or Aldrich; or Maybridge-Int	Intermediate 58	418	2.77
272		WO 99/38877	Intermediate 58	427	2.13

273		N.D. Zelinsky Institute	Intermediate 58	396	2.15
274		Aldrich	Intermediate 58	330	2.10
275		Matrix Scientific	Intermediate 58	399	2.29

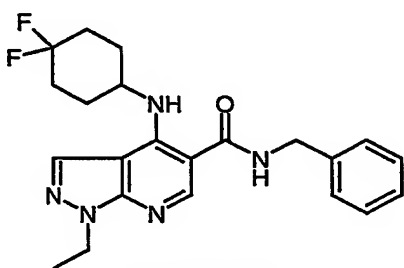
Example 276 - 287**General Procedure**

A mixture of Intermediate 59 (0.1mmol), HATU (0.1mmol) and DIPEA (0.4mmol) in DMF (0.4ml) was shaken at room temperature for 10 min. A solution of the amine (0.1mmol) in DMF (0.2ml) was then added and the mixture agitated for several minutes to give a solution. The solution was stored at room temperature for 16 hours then concentrated *in vacuo*. The residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g). The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and EtOAc:MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated *in vacuo* and the residue purified by mass directed autoprep HPLC.

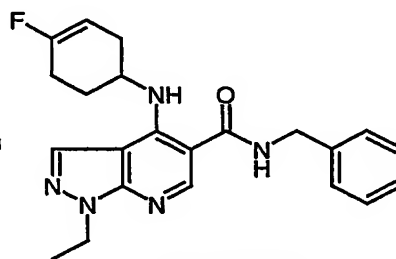
Example no.	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
276		Aldrich	Intermediate 59	392	2.60
277		Fluorochem; or WO 98/45268	Intermediate 59	446	2.84
278		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 59	448	3.0
279		Acros	Intermediate 59	458	2.40

280		EP 382570	Intermediate 59	458	2.47
281		Aldrich	Intermediate 59	384	2.85
282 (as CF ₃ CO ₂ H salt)		Aldrich	Intermediate 59	381	1.89
283		TCI-America; or Aldrich; or Maybridge-Int	Intermediate 59	406	2.80
284		WO 99/38877	Intermediate 59	415	2.14
285		N.D. Zelinsky Institute	Intermediate 59	384	2.16
286		Aldrich	Intermediate 59	318	2.11
287		Matrix Scientific	Intermediate 59	399	2.29

Example 288: 4-[(4,4-Difluorocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide and **Example 289:** 1-Ethyl-4-[(4-fluoro-3-cyclohexen-1-yl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide.



Example 288

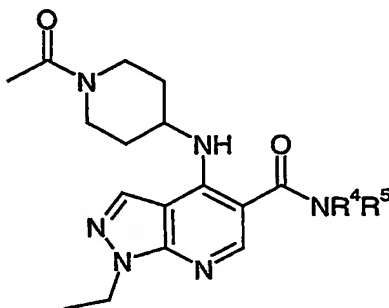


Example 289

Diisopropylethylamine (0.113ml, 0.65mmol) was added to a stirred mixture of Intermediate 17 (40mg, 0.13mmol) and Intermediate 63 (45mg, 0.26mmol) in acetonitrile (2ml). The mixture was stirred at 85°C. After 18h, a further portion of Intermediate 63 (22.5mg, 0.13mmol) and diisopropylethylamine (0.113ml, 0.65mmol) was added to the reaction mixture and stirring was continued at 90°C for 24h. The mixture was then concentrated in vacuo and the residue was partitioned between DCM (20ml) and water (5ml). The phases were separated and the aqueous phase was extracted with further DCM (10ml). The combined organic extracts were dried (Na₂SO₄) and evaporated in vacuo to give a brown oil (65mg) which was partially purified on a SPE cartridge (silica, 10g), eluting with ethyl acetate : petroleum ether

(1:8; 1:4; 1:2; 1:1 and 1:0). The resulting two-component pale-brown oil (34mg) was separated by mass directed auto prep HPLC to give Example 288 (19mg) as a white foam (LCMS showed $MH^+ = 414$; $T_{RET} = 3.24\text{min}$) and Example 289 (9mg) as a white solid (LCMS showed $MH^+ = 394$; $T_{RET} = 3.21\text{min}$).

Examples 290 - 319

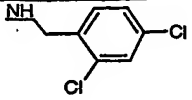
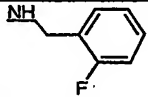
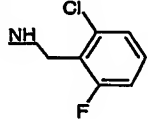
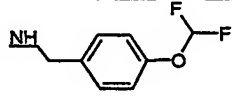
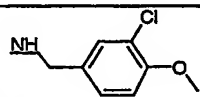
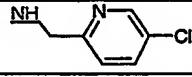
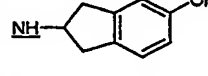
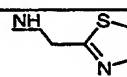
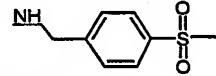
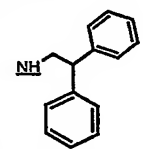
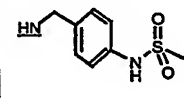
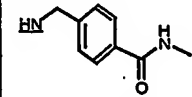
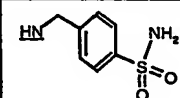
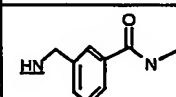


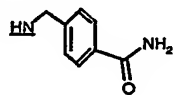
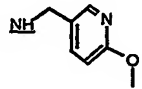
General Procedure

A mixture of Intermediate 60 (0.1mmol), HATU (0.1mmol) and DIPEA (0.4mmol) in DMF (0.4ml) was shaken at room temperature for 10 min. A solution of the amine (0.1mmol) in DMF (0.2ml) was then added and the mixture agitated for several minutes to give a solution. The solution was stored at room temperature for 16 hours then concentrated *in vacuo*. The residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g). The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and EtOAc:MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated *in vacuo* and the residue purified by mass directed autoprep HPLC.

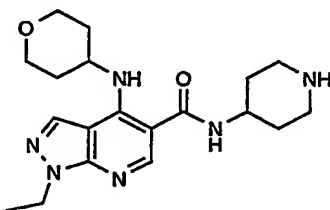
Example no.	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
290		Aldrich; or TCI-America; or Maybridge-Int	Intermediate 60	447	2.96
291		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 60	488/490	3.16
292		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 60	439	2.84

293		Aldrich	Intermediate 60	457	2.92
294		Aldrich	Intermediate 60	457	2.87
295		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 60	489	3.06
296		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 60	489	3.08
297		Aldrich	Intermediate 60	457	2.82
298		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 60	455	2.98
299		Aldrich; or Acros; or Jung et al., <i>Tetrahedron Lett.</i> , 2002, 43(48), 8735; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 60	451	2.79
300		Aldrich	Intermediate 60	437	2.82
301		Peakdale Molecular Ltd	Intermediate 60	528	2.76
302		Aldrich	Intermediate 60	461	3.00
303		Peakdale Molecular Ltd	Intermediate 60	464	2.31

304		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 60	489	3.16
305		Aldrich; or <i>Org. Lett.</i> , 2002, 4(12), 2055	Intermediate 60	439	2.84
306		Fluka	Intermediate 60	473	2.92
307		Fluorochem Ltd; or WO 98/45268	Intermediate 60	487	2.95
308		Apin	Intermediate 60	485	2.94
309		Key Organics Ltd	Intermediate 60	456	2.65
310		<i>J. Med. Chem.</i> , 2001, 44(26), 4628	Intermediate 60	481	3.16
311		Manchester Organics Ltd	Intermediate 60	428	2.28
312		Acros Chimica	Intermediate 60	499	2.37
313		Aldrich	Intermediate 60	511	3.18
314		Lis et al., <i>J. Med. Chem.</i> , 1990, 33(10), 2883, see Scheme III and ref. 24	Intermediate 60	514	2.60
315		WO 94/17035	Intermediate 60	478	2.47
316		Sigma	Intermediate 60	500	2.50
317		Peakdale Molecular Ltd	Intermediate 60	478	2.49

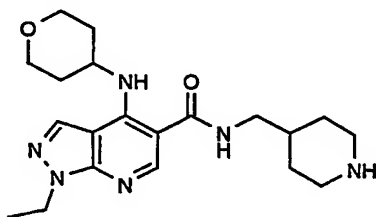
318		WO 02/85860	Intermediate 60	464	2.42
319		Syngene	Intermediate 60	452	2.45

Example 320 1-Ethyl-N-4-piperidinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



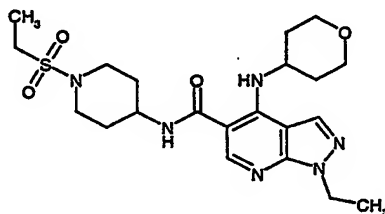
A solution of hydrogen chloride in dioxan (30ml, 4M, 0.12mol) was added to a suspension of Example 126 (1.3g, 2.75mmol), in dioxan (10ml) and the mixture was stirred at room temperature for 6h. The reaction mixture was left to stand for 14h, then the solution was evaporated, azeotroping with DCM to give a white solid the hydrochloride salt. The solid was suspended in ethyl acetate (50ml) and washed with sodium hydroxide solution (2N, 50ml). The organic layer was dried over Na₂SO₄ and concentrated in vacuo to give Example 318 as a white solid (995mg). LCMS showed MH⁺ = 373; T_{RET} = 1.89min.

Example 321 1-Ethyl-N-(4-piperidinylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



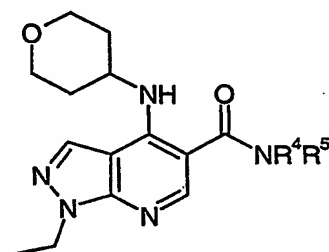
A solution of hydrogen chloride in dioxan (30ml, 4M, 0.12mol) was added to a suspension of Intermediate 72 (1.2, 2.5mol), in dioxan (10ml) and the mixture was stirred at room temperature for 6h. The reaction mixture was left to stand for 14h, then the solution was evaporated, azeotroping with DCM to give a white solid (1.24g). A portion of the solid (68mg) was suspended in ethyl acetate and washed with 2M-sodium hydroxide solution. The organic layer was dried over Na₂SO₄ and concentrated in vacuo to afford Example 321 as a white solid (60mg). LCMS showed MH⁺ = 387; T_{RET} = 1.92min.

Example 322 1-Ethyl-N-[1-(ethylsulfonyl)-4-piperidiny]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



Triethylamine (0.023ml, 0.16mmol) was added to a solution of Example 320 (0.043g, 0.115mol) in DCM (1ml). The mixture was cooled (ice/water bath for 10min) and ethane sulfonyl chloride (0.014ml, 0.138mmol) was added. The resultant solution was stirred at room temperature for 18h, then the solvent was removed with a stream of nitrogen. The residue was dissolved in dichloromethane (1.5ml) and stirred with water (1.5ml). The organic layer was separated and blown down with nitrogen, and applied to a SPE cartridge (silica, 2g) eluting with 60%-100% ethyl acetate in cyclohexane. The desired fractions were concentrated in vacuo to afford Example 322 as a white solid (32mg). LCMS showed $MH^+ = 465$; $T_{RET} = 2.52min$

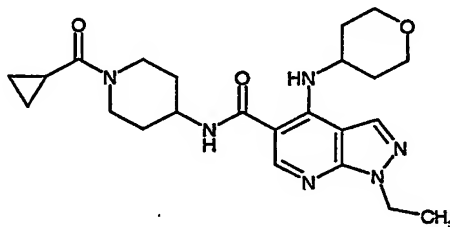
Similarly prepared were the following,



Example no.	NR^4R^5	Sulfonyl chloride	Source of sulfonyl chloride	MH + ion	LC-MC Retention time
323			Aldrich	479	2.58
324			<i>J. Org. Chem.</i> , 1952, 17, 1529	505	2.75
325			Aldrich	451	2.41

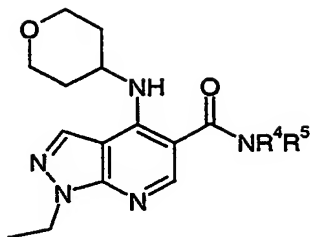
326			Aldrich	527	2.90
327			Aldrich	513	2.66
328			Aldrich	479	2.42

Example 329 *N*-[1-(Cyclopropylcarbonyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide

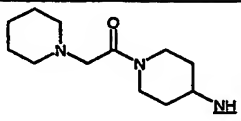
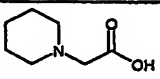
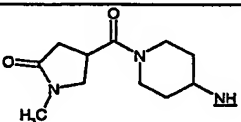
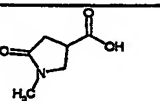
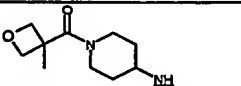
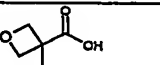
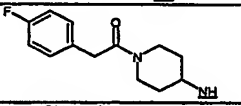
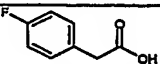
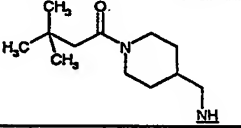
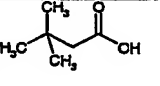
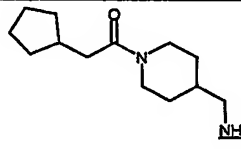
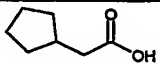
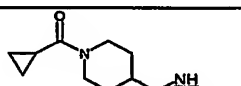
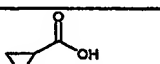
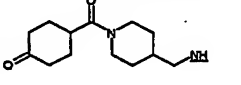
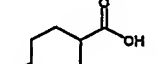
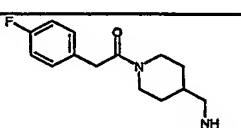
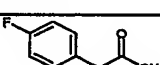
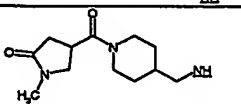
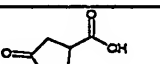


Cyclopropane carboxylic acid (0.011ml, 0.138mmol), EDC (0.031g, 0.161mmol) and HOBT (0.019g, 0.138mmol) were suspended in DMF (2ml) and stirred at room temperature for 1h. Example 320 (0.043g, 0.115mmol) was added and the mixture was stirred at room temperature for 16 hours. Most of the solvent was removed using a stream of nitrogen and the residue was partitioned between DCM (3ml) and water (3ml). The organic layer was blown down with nitrogen and applied to a SPE cartridge (aminopropyl, 1g), which was eluted with methanol. Concentration by blowing down with nitrogen afforded an impure residue which was further purified by SPE cartridge (silica, 1g), eluting with 50-100% EtOAc in cyclohexane followed by 5% methanol in EtOAc. The desired fractions were concentrated *in vacuo* to afford Example 329 as a white solid (49mg). LCMS showed $MH^+ = 441$; $T_{RET} = 2.23min$

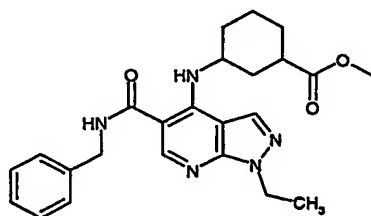
Similarly prepared, using the same or similar numbers of moles of reagents and volumes of solvents, and using Example 320 as the starting material to make Examples 330 to 343, but using Example 321 (similar number of moles) instead of Example 320 as the starting material to make Examples 344 to 349, were the following:



Example no.	NR ⁴ R ⁵	Carboxylic acid	Source of Carboxylic acid	MH ⁺ ion	LC-MC Retention time
330			Aldrich	467	2.50
331			Aldrich	471	2.73
332			Aldrich	471	2.72
333			Aldrich	483	2.81
334			Aldrich	443	2.27
335			Combi-Blocks	485	2.17
336			Aldrich	429	2.38
337			Aldrich	472	2.20
338			Synchem OHG	500	1.91
339			<i>J. Med. Chem.</i> , 1998, 41(5), 760	497	2.17

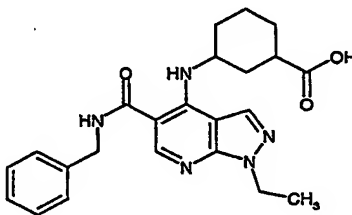
340			Micro-Chemistry Building Blocks	498	1.94
341			Interchim Intermediates	498	2.07
342			DE 3618135	471	2.33
343			Aldrich	509	2.75
344			Aldrich	485	2.78
345			Aldrich	497	2.85
346			Aldrich	455	2.50
347			<i>J. Med. Chem.</i> , 1998, 41(5), 760	511	2.42
348			Aldrich	523	2.78
349			Interchim Intermediates	512	2.29

Example 350 Methyl 3-[(1-ethyl-5-[(phenylmethyl)amino]carbonyl)-1H-pyrazolo[3,4-b]pyridin-4-yl)amino]cyclohexanecarboxylate



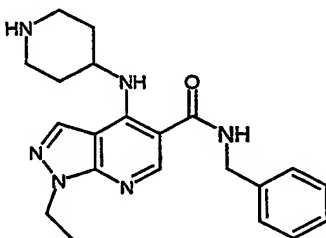
Example 350 was prepared from Intermediate 17 and using an analogous method to that used for the preparation of Example 207. LCMS showed $MH^+ = 436$; $T_{RET} = 3.20$.

Example 351 3-[(1-Ethyl-5-[(phenylmethyl)amino]carbonyl)-1*H*-pyrazolo[3,4-*b*]pyridin-4-yl)amino]cyclohexanecarboxylic acid



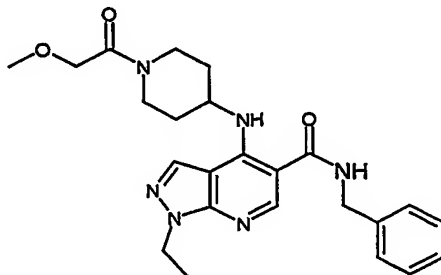
2M-Sodium hydroxide solution (0.5ml) was added to a stirred suspension of Example 350 (0.12g, 0.275mmol) in methanol (3.5ml) and water (0.8ml). After stirring overnight at room temperature, the reaction solution was concentrated, diluted with water (3ml) and acidified with 2M-hydrochloric acid. The resulting precipitate was collected by filtration, washed with water and dried to give Example 351, as a white solid (0.105g). LCMS showed $MH^+ = 422$; $T_{RET} = 2.95$ min.

Example 352: 1-Ethyl-*N*-(phenylmethyl)-4-(4-piperidinylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide



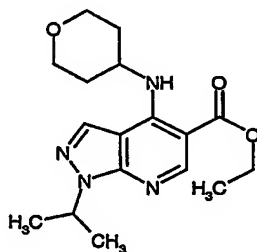
Aqueous hydrochloric acid (20ml, 5M) was added to a solution of Intermediate 65 (2.58g, 5.40mmol) in tetrahydrofuran (10ml). The reaction mixture was stirred at 20 °C for 22h then evaporated in vacuo. The residue was partitioned between DCM and water. The aqueous phase was basified with aqueous sodium hydroxide solution (2M) and extracted with diethyl ether. The organic phases was evaporated in vacuo to give Example 352 as a white solid (2.04g). LCMS showed $MH^+ = 379$; $T_{RET} = 2.10$ min.

Example 353: Ethyl 1-ethyl-4-([1-[(methoxy)acetyl]-4-piperidinyl]amino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate



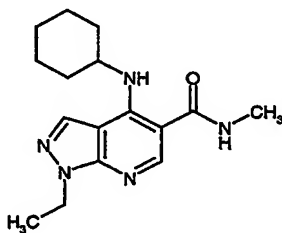
Methoxyacetyl chloride (0.016mg, 0.144mmol) and triethylamine (0.02mol, 0.144mmol) were added to a solution of Example 352 (0.046g, 0.122mmol) in DCM in a Reactivial. The reaction was stirred for 22h at 20 °C then diluted with DCM and washed with aqueous sodium hydrogen carbonate solution. The organic phase was separated and applied directly to a SPE cartridge (silica 2g). The cartridge was eluted with DCM : MeOH (1% followed by 3%) to give Example 353 as a white solid (0.05g). LCMS showed $MH^+ = 451$; $T_{RET} = 2.66$ min.

Example 354: Ethyl 1-(1-methylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



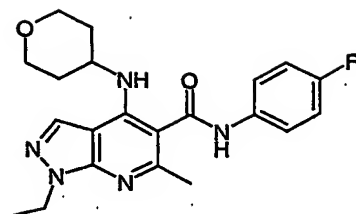
Prepared in a similar manner to example 186 using Example 20 (0.03g, 0.1mmol), with isopropylbromide (10uL, 0.11mmol), a further 0.11mmol of alkylating agent was added after 16 hours. The final compound was formed as a clear gum (16mg). LCMS showed $MH^+ = 333$; $T_{RET} = 3.16$ min.

Example 355: 4-(Cyclohexylamino)-1-ethyl-N-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



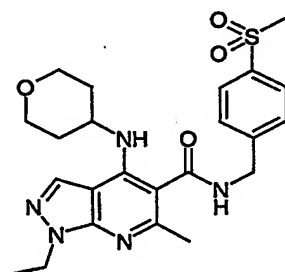
Intermediate 64 (0.02g, 0.084mmol) and diisopropylethylamine (0.044ml, 0.252mmol) were suspended in N-methyl pyrrolidinone (1ml) and cyclohexylamine (0.012ml, 0.1mmol) was added. The mixture was heated at 85°C with stirring in a Reactivial™ for 8h, then concentrated in vacuo. The residue was partitioned between DCM (2ml) and water (2ml). The layers were separated and the organic layer was concentrated in vacuo, then purified by mass directed autotprep HPLC to afford Example 355 (0.012g). LCMS showed $MH^+ = 302$; $T_{RET} = 2.85$ min.

Example 356: 1-Ethyl-N-(4-fluorophenyl)-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



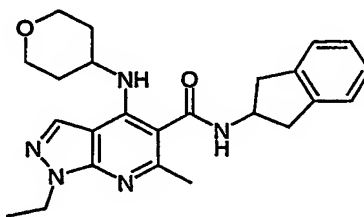
Example 356 was prepared from Intermediate 53 using an analogous method to Example 191. LCMS showed $MH^+ = 398$; $T_{RET} = 2.18\text{min}$.

Example 357: 1-Ethyl-6-methyl-N-[[4-(methylsulfonyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



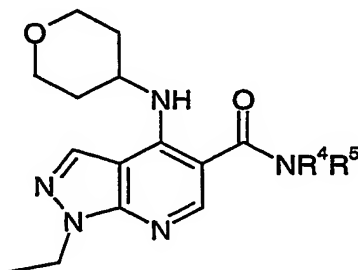
Example 357 was prepared from Intermediate 53 using an analogous method to Example 191. LCMS showed $MH^+ = 472$; $T_{RET} = 2.15\text{min}$.

Example 358: N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



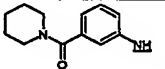
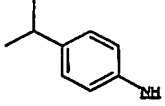
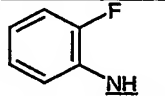
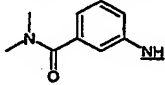
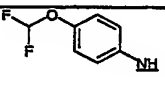
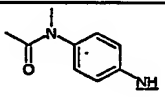
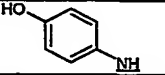
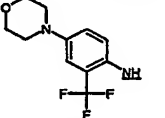
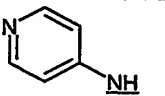
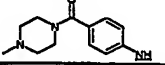
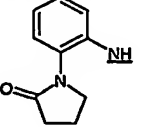
Example 358 was prepared from Intermediate 53 using an analogous method to Example 191. LCMS showed $MH^+ = 394$; $T_{RET} = 2.04\text{min}$.

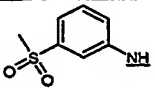
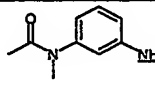
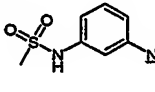
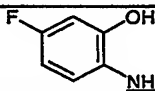
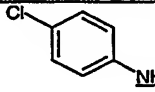
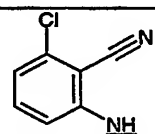
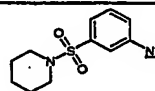
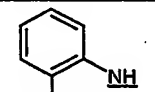
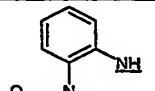
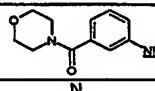
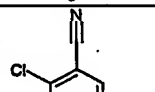
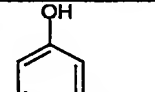
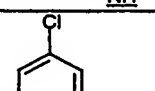
Examples 360 - 414

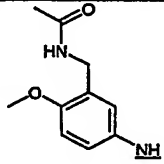
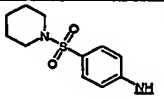
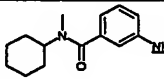
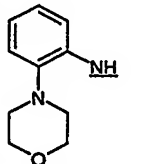
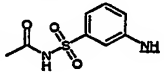
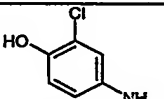
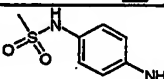
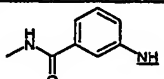
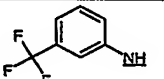
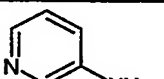
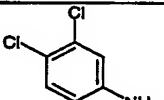
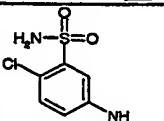
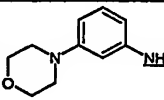
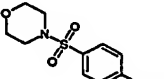


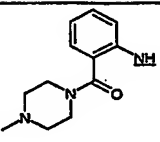
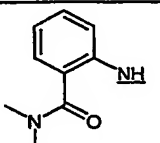
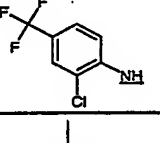
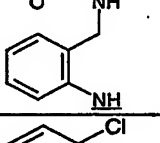
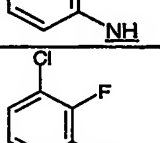
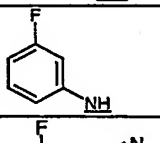
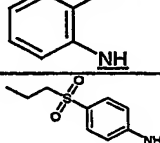
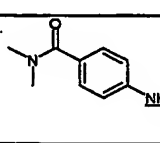
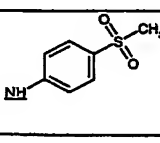
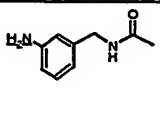


General Procedure

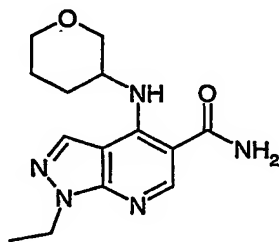
Intermediate 33 (1.89g) was treated with thionyl chloride (10ml) and the mixture heated under reflux for 2h. Excess thionyl chloride was removed in vacuo to afford Intermediate 73, presumed to be the acid chloride of Intermediate 33 as a cream solid. The solid was suspended in tetrahydrofuran (32.5ml) and an aliquot of the suspension added to a mixture of the amine (0.11mmol) and N,N-diisopropylethylamine (0.165 - 0.22mmol) in THF (0.5ml). The reaction mixture was agitated for 24h and the solvent removed in vacuo. The residue was purified by mass directed autoprep HPLC.

Example Number	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
360		Interchim Intermediates	Intermediate 33	477	2.98
361		Aldrich	Intermediate 33	408	3.45
362		Aldrich	Intermediate 33	384	3.09
363		Butt Park Ltd.	Intermediate 33	437	2.69
364		Aldrich	Intermediate 33	432	3.21
365		Maybridge Chemical Company Ltd.	Intermediate 33	437	2.72
366		Aldrich	Intermediate 33	382	2.67
367		Interchim Intermediates	Intermediate 33	519	3.01
368		Aldrich	Intermediate 33	367	2.19
369		Butt Park Ltd.	Intermediate 33	492	2.21
370		<i>J. Chem. Soc. C</i> , 1969, 1444	Intermediate 33	449	2.72

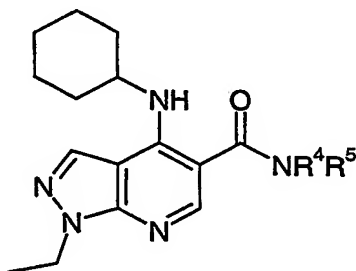
371		Peakdale Technologies Limited M	Intermediate 33	444	2.81
372		<i>J. Heterocycl. Chem.</i> , 1975, 12(2), 225	Intermediate 33	437	2.74
373		Interchim Intermediates	Intermediate 33	459	2.79
374		Apollo Scientific Ltd.	Intermediate 33	400	2.99
375		Aldrich	Intermediate 33	400	3.35
376		Lancaster	Intermediate 33	425	3.07
377		Maybridge CombiChem	Intermediate 33	513	3.33
379		Peakdale Technologies Limited	Intermediate 33	444	2.99
380		<i>J. Heterocycl. Chem.</i> , 1975, 12(2), 225	Intermediate 33	437	2.64
381		Interchim Intermediates	Intermediate 33	479	2.68
382		Aceto Corporation	Intermediate 33	425	3.38
383		Aldrich	Intermediate 33	382	2.78
384		Aldrich	Intermediate 33	400	3.38

386		WO 03/32986	Intermediate 33	467	2.65
387		Maybridge Chemical Company Ltd.	Intermediate 33	513	3.35
388		Intermediate 67	Intermediate 33	505	3.23
389		Lancaster	Intermediate 33	451	3.17
390		EP 538945	Intermediate 33	487	2.80
391		Aldrich	Intermediate 33	416	2.99
392		Interchim Intermediates	Intermediate 33	459	2.74
393		Butt Park Ltd.	Intermediate 33	423	2.66
394		Aldrich	Intermediate 33	434	3.43
395		Aldrich	Intermediate 33	367	2.40
396		Aldrich; or Reetz, <i>Synthesis</i> , 1999, 9, 1555	Intermediate 33	434	3.67
397		Bayer AG	Intermediate 33	479	2.89
398		Exploratory Library	Intermediate 33	451	2.91
399		Maybridge Chemical Company Ltd.	Intermediate 33	515	3.02

400		TimTec	Intermediate 33	492	2.20
401		Exploratory Library	Intermediate 33	437	2.68
402		Lancaster	Intermediate 33	468	3.53
403		<i>Heterocycles</i> , 1983 20(3), 445	Intermediate 33	437	2.70
404		Aldrich	Intermediate 33	400	3.09
405		Aldrich	Intermediate 33	418	3.21
406		Aldrich	Intermediate 33	384	3.19
407		Aldrich	Intermediate 33	409	2.95
408		<i>Helv. Chim. Acta</i> , 1983 66(4), 1046	Intermediate 33	472	3.07
409		Butt Park Ltd.	Intermediate 33	437	2.68
411		Salor	Intermediate 33	444	2.69
413		Peakdale Molecular Limited	Intermediate 33	437	2.35

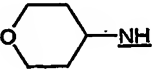
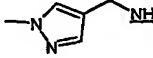
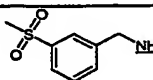
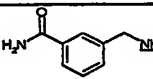
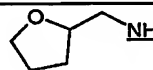
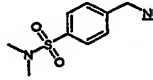
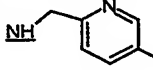
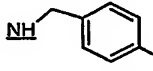
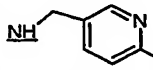
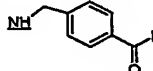
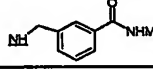
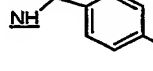
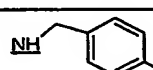
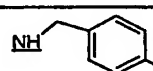
Example 414: 1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

Example 414 was prepared from Intermediate 59 using the general method described for examples 360 - 413 method. LCMS showed $MH^+ = 398$; $T_{RET} = 2.90$ min.

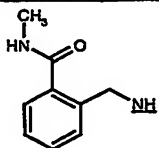
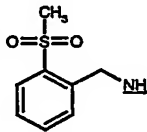
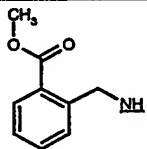
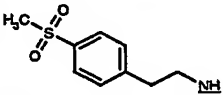
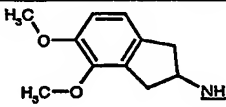
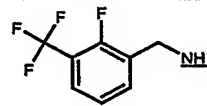
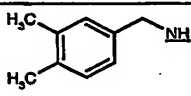
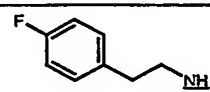
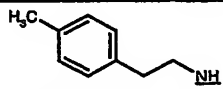
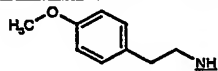
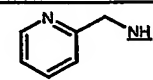
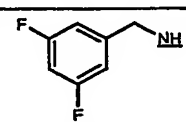
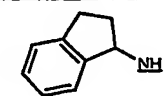
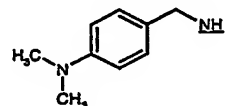
Examples 415 - 487**General Procedure**

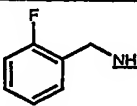
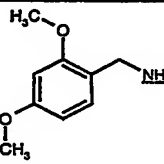
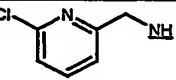
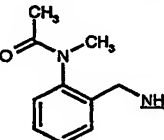
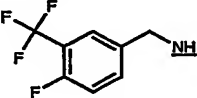
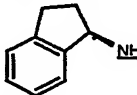
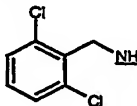
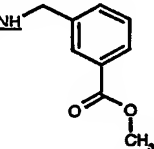
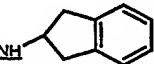
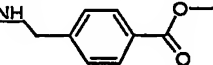
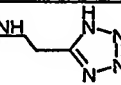
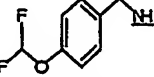
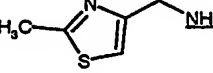
A mixture of Intermediate 61 (0.1mmol), HATU (0.1mmol) and DIPEA (0.4mmol) in DMF (0.4ml) was shaken at room temperature for 10 min. A solution of the amine (0.1mmol) in DMF (0.2ml) was then added and the mixture agitated for several minutes to give a solution. The solution was stored at room temperature for 16 hours then concentrated *in vacuo*. The residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g). The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and EtOAc:MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated *in vacuo* and the residue purified by mass directed autoprep HPLC.

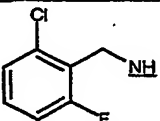
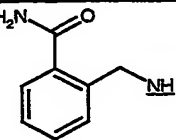
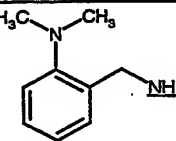
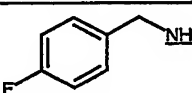
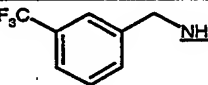
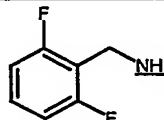
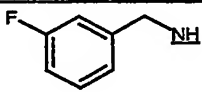
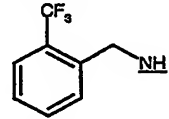
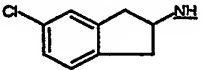
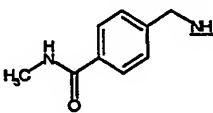
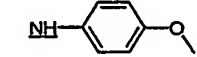
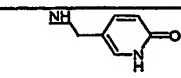
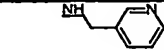
Example number	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
415		Rare Chemicals GmbH	Intermediate 61	395	2.80
416		Aldrich	Intermediate 61	345	2.64
417		Ultrafine (UFC Ltd)	Intermediate 61	409	2.84

418		Intermediate 8A; or Intermediate 8 (Combi-Blocks)	Intermediate 61	372	3.03
419		N.D. Zelinsky Institute Organic Chemistry	Intermediate 61	382	2.96
420		Peakdale Molecular Ltd.	Intermediate 61	456	3.22
421		Peakdale Molecular Ltd.	Intermediate 61	421	3.03
422		Aldrich	Intermediate 61	372	3.09
423		<i>J. Org. Chem.</i> , 1955, <u>20</u> , 1657	Intermediate 61	485	3.44
424		Key Organics Ltd	Intermediate 61	413	3.39
425		Acros	Intermediate 61	456	3.19
426		WO 00/17163	Intermediate 61	409	3.3
427		Peakdale Molecular Ltd	Intermediate 61	421	3.23
428		Peakdale Molecular Ltd	Intermediate 61	435	3.07
429		Peakdale Molecular Ltd	Intermediate 61	421	2.97
430		Apin	Intermediate 61	394	3.25
431		Acros; or Aldrich; or Jung et al., <i>Tetrahedron Lett.</i> , 2002, 43(48), 8735; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Org. Lett.</i> , 2002, 4, 2055	Intermediate 61	408	3.51

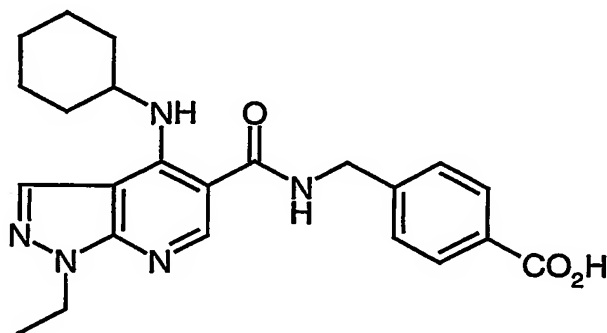
432		Aldrich	Intermediate 61	414	3.68
433		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	446	3.81
434		<i>J. Med. Chem.</i> , 1999, 42(14), 2504	Intermediate 61	471	3.23
435		Aldrich	Intermediate 61	414	3.66
436		Aldrich; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 61	392	3.69
438		Key Organics Ltd	Intermediate 61	485	3.25
439		Buttpark	Intermediate 61	394	3.52
440		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	446	4
441		Lancaster; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	446	4.08
442		Aldrich	Intermediate 61	392	3.62
443		Aldrich	Intermediate 61	418	3.83
444		WO 01/38323	Intermediate 61	440	3.07
445		Aldrich	Intermediate 49	408	3.31
446		Acros	Intermediate 61	471	3.13

447		Peakdale Molecular Ltd	Intermediate 61	435	3.13
448		Peakdale Molecular Ltd	Intermediate 61	456	3.32
449		Peakdale Molecular Ltd	Intermediate 61	436	3.56
450		Aldrich	Intermediate 61	471	2.79
451		<i>J. Med. Chem.</i> , 1982, 25(12), 1442	Intermediate 61	465	3.11
452		ABCR	Intermediate 61	464	3.47
453		Matrix Scientific; or <i>Chem. Ber.</i> , 1969, 102, 2770	Intermediate 61	407	3.35
454		Aldrich	Intermediate 61	411	3.18
455		Aldrich	Intermediate 61	407	3.3
456		Aldrich	Intermediate 61	423	3.09
457 (as CF ₃ C(O)OH salt)		Aldrich	Intermediate 61	379	2.92
458		Aldrich	Intermediate 61	414	3.68
459		Aldrich	Intermediate 61	404	3.72
460 (as CF ₃ C(O)OH salt)		Aldrich	Intermediate 61	421	3.29

461		Aldrich	Intermediate 61	396	3.58
462		Aldrich	Intermediate 61	438	3.53
463 (as CF ₃ C(O)OH salt)		<i>Inorganic Chemistry</i> , 1997, 36(9), 1967	Intermediate 61	413	3.4
464 (as CF ₃ C(O)OH salt)		Peakdale Molecular Ltd	Intermediate 61	449	3.18
465		ABCR	Intermediate 61	422	3.77
466		Aldrich	Intermediate 61	404	3.72
467		Pfaltz-Bauer; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	446	3.85
468		Peakdale Molecular Ltd	Intermediate 61	436	3.53
469		Aldrich	Intermediate 61	404	3.66
470		Aldrich	Intermediate 61	435	3.52
471		Esprit	Intermediate 61	370	2.82
472		Apollo	Intermediate 61	444	3.63
473		MicroChemistry-RadaPharma	Intermediate 61	399	3.16

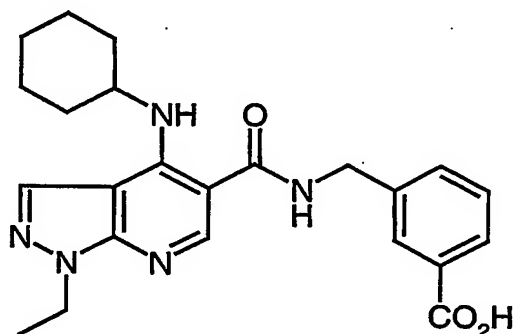
474		Fluka	Intermediate 61	430	3.72
475		<i>J. Am. Chem. Soc.</i> , 1977, 99, 3075	Intermediate 61	421	3.04
477		<i>J. Org. Chem.</i> , 2001, 66(6), 1999	Intermediate 61	421	2.89
478		Aldrich	Intermediate 61	396	3.59
479		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	446	3.80
480		Aldrich	Intermediate 61	414	3.57
481		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 61	396	3.62
482		Aldrich	Intermediate 61	446	3.82
483		<i>J. Med. Chem.</i> , 2001, 44(26), 4628	Intermediate 61	438	3.95
484		WO 9417035	Intermediate 61		
485		Aldrich	Intermediate 61	394	3.61
486		MicroChemistry-RadaPharma	Intermediate 61	395	2.78
487		Aldrich	Intermediate 61	379	2.71

Example 488: 4-[[[4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino)methyl]benzoic acid



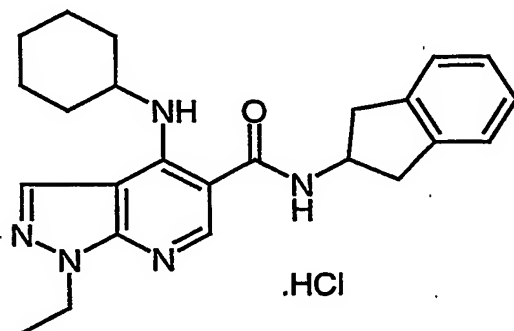
2M-Sodium hydroxide solution (29 μ L, 0.058mmol) was added to a stirred solution of Example 470 (6mg, 0.014mmol) in methanol (28 μ L) and water (2 μ L). The resulting solution was stirred at 50°C under nitrogen. After 16h, the mixture was diluted with water (0.5ml) and adjusted to pH 4 with acetic acid. The precipitated solid was collected by filtration and dried in vacuo to afford Example 488 as a white solid (4.5mg). LCMS showed $MH^+ = 422$; $T_{RET} = 3.26$ min.

Example 489: 3-[[[4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino)methyl]benzoic acid



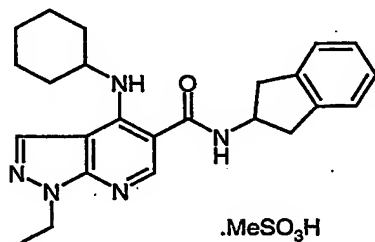
2M-Sodium hydroxide solution (83 μ L, 0.166mmol) was added to a stirred solution of Example 468 (18mg, 0.042mmol) in methanol (88 μ L) and water (5 μ L). The resulting solution was stirred at 50°C under nitrogen. After 16h, a further quantity of 2M-sodium hydroxide solution (29 μ L, 0.058mmol) was added to the reaction mixture. After 24h, the reaction mixture was diluted with water (0.5ml) and adjusted to pH 4 with acetic acid. The mixture was extracted with ethyl acetate (2 x 0.5ml), and the combined extracts were dried (Na_2SO_4) and evaporated in vacuo to give a solid (21mg). This solid was purified on an SPE cartridge (silica, 1g) eluting with ethyl acetate:cyclohexane (1:1) followed by methanol. Fractions containing the desired product were combined and concentrated to afford Example 489 as a white solid (4.6mg). LCMS showed $MH^+ = 422$; $T_{RET} = 3.22$ min.

Example 490: 4-(Cyclohexylamino)-*N*-(2,3-dihydro-1*H*-inden-2-yl)-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide hydrochloride



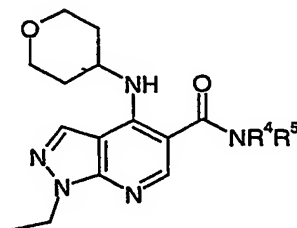
A solution of Example 469 (71mg, 0.17mmol) in anhydrous THF (2ml) was treated with hydrogen chloride in dioxane (4M, 0.3ml). After standing at ambient temperature for 16 hours the resulting solid was collected by filtration and dried under vacuum to give Example 490 as rod like crystals (36mg). LCMS showed MH^+ = 404; T_{RET} = 3.60min.

Example 491: 4-(Cyclohexylamino)-*N*-(2,3-dihydro-1*H*-inden-2-yl)-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide methanesulphonate



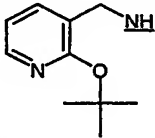
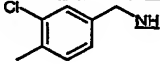
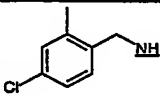
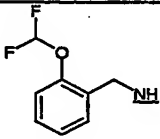
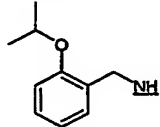
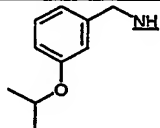
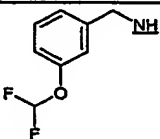
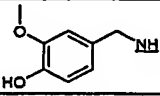
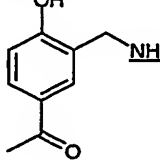
A solution of Example 469 (71mg, 0.17mmol) in anhydrous THF (2ml) was treated with anhydrous methane sulphonic acid (11.4 μ L, 0.17mmol). After standing at ambient temperature for 16 hours the resulting solid was collected by filtration and dried under vacuum to give Example 491 as rod like crystals (23mg). LCMS showed MH^+ = 404; T_{RET} = 3.59min.

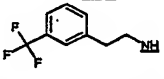
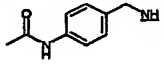
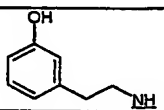
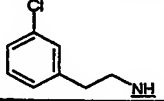
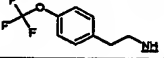
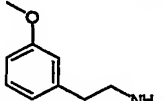
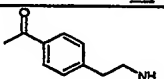
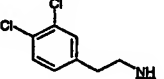
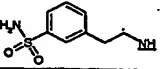
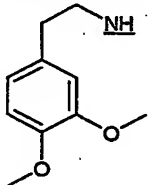
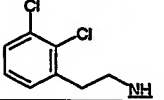
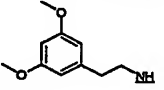
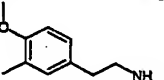
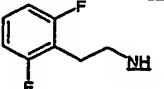
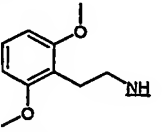
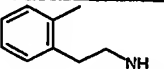
Examples 492 - 649

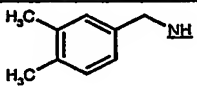
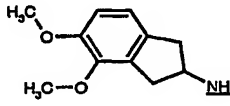
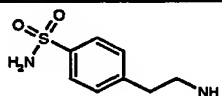
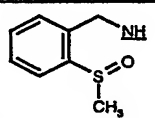
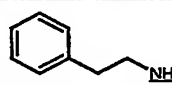
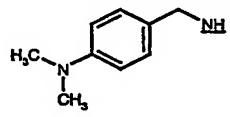
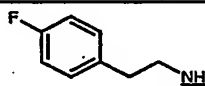
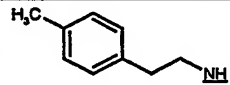
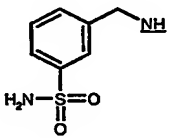
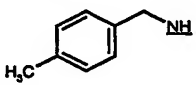
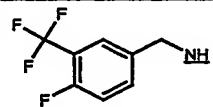
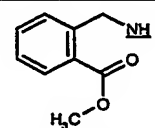
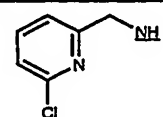


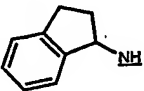
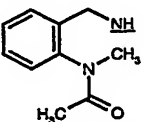
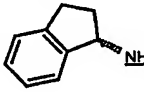
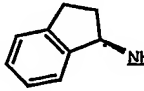
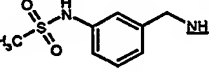
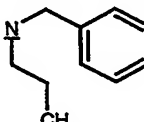
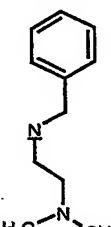
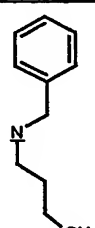
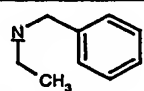
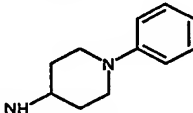
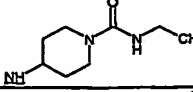
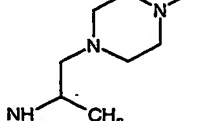
General Procedure

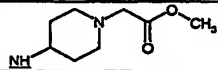
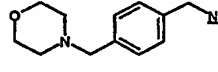
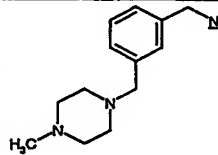
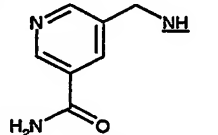
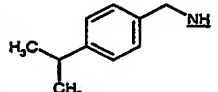
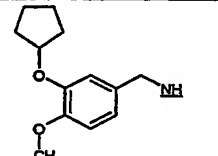
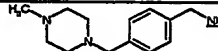
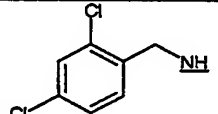
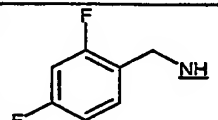
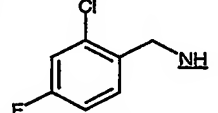
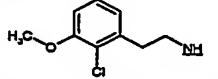
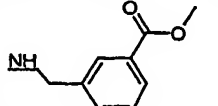
A mixture of Intermediate 33 (0.1mmol), HATU (0.1mmol) and DIPEA (0.4mmol) in DMF (0.4ml) was shaken at room temperature for 10 min. A solution of the amine (0.1mmol) in DMF (0.2ml) was then added and the mixture agitated for several minutes to give a solution. The solution was stored at room temperature for 16 hours then concentrated *in vacuo*. The residue was dissolved in chloroform (0.5ml) and applied to a SPE cartridge (aminopropyl, 0.5g). The cartridge was eluted successively with chloroform (1.5ml), EtOAc (1.5ml) and EtOAc:MeOH (9:1, 1.5ml). Fractions containing the desired product were concentrated *in vacuo* and the residue purified by mass directed autoprep HPLC.

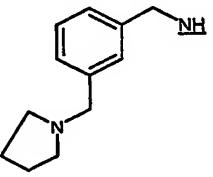
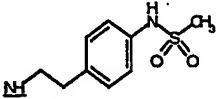
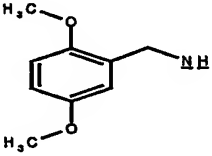
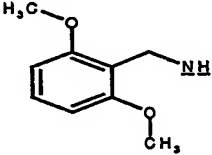
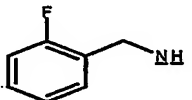
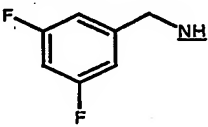
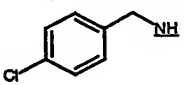
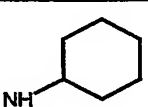
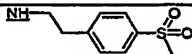
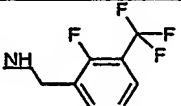
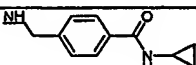
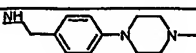
Example number	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time
492 (as CF ₃ C(O)OH salt)		Peakdale Molecular Ltd.	Intermediate 33	453	2.90
493		Maybridge Chemical Company Ltd.; or WO 01/30745	Intermediate 33	428	2.92
494		Trans World Chemicals, Inc.; or DE 1953059	Intermediate 33	428	2.91
495		Fluorochem Ltd.	Intermediate 33	446	2.70
496		Peakdale Molecular Ltd.	Intermediate 33	438	2.83
497		Peakdale Molecular Ltd.	Intermediate 33	438	2.79
498		Fluorochem Ltd.	Intermediate 33	446	2.73
499		Aldrich	Intermediate 33	426	2.50
500		Nippon Kagaku Zasshi; 1952, 73; 393	Intermediate 33	438	2.62

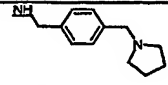
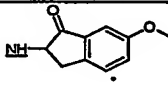
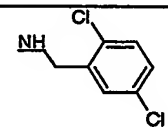
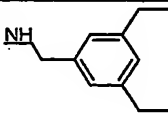
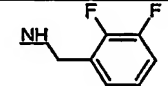
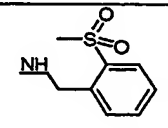
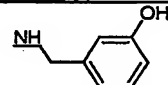
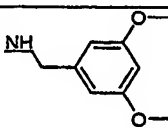
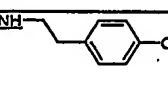
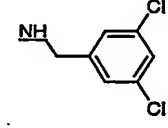
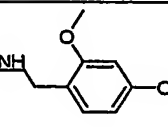
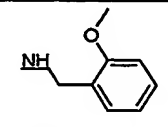
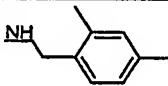
501		Apollo Scientific Ltd.	Intermediate 33	462	2.88
502		Apin Chemicals Ltd.	Intermediate 33	437	2.19
503		Sigma	Intermediate 33	410	2.60
504		Aldrich	Intermediate 33	428	2.80
505		Miteni S.p.A.	Intermediate 33	478	2.97
506		Aldrich	Intermediate 33	424	2.58
507		<i>J. Med. Chem.</i> , 1997, 20(9), 1210	Intermediate 33	436	2.44
508		Fluorochem Ltd.	Intermediate 33	462	2.99
509		JP 11080156	Intermediate 33	473	2.2
510		Aldrich	Intermediate 33	454	2.41
512		Synchem OHG	Intermediate 33	462	2.96
513		Apin Chemicals Ltd.	Intermediate 33	454	2.59
514		<i>J. Chem. Soc. Perkin Trans. 1</i> , 1977, 386	Intermediate 33	438	2.75
515		SIGMA-RBI	Intermediate 33	430	2.65
516		WO 9303022	Intermediate 33	454	2.67
517		SIGMA-RBI	Intermediate 33	408	2.73

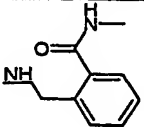
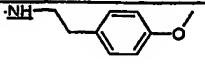
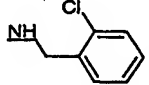
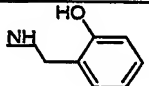
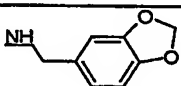
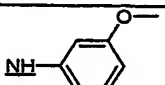
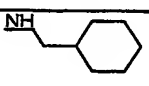
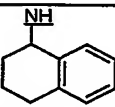
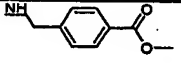
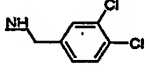
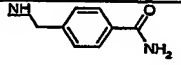
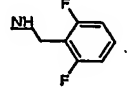
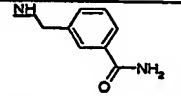
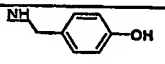
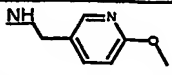
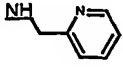
518		Matrix Scientific; or <i>Chem. Ber.</i> , 1969, 102, 2770	Intermediate 33	408	3.2
519		<i>J. Med. Chem.</i> , 1982 25(12), 1442	Intermediate 33	466	3
521		Acros	Intermediate 33	473	2.62
522		WO 01/38323	Intermediate 33	445	2.55
523		Aldrich	Intermediate 33	394	3
524		Aldrich	Intermediate 33	423	2.51
525		Aldrich	Intermediate 33	412	3.06
526		Aldrich	Intermediate 33	408	3.16
527		<i>Yakugaku Zasshi</i> ; 1950 70, 71	Intermediate 33	459	2.6
528		Aldrich; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	394	3.08
530		Lancaster	Intermediate 33	466	3.31
531		<i>J. Am. Chem. Soc.</i> , 1976, 78(22), 6978	Intermediate 33	438	3
532 (as CF ₃ C(O)OH salt)		<i>Inorganic Chemistry</i> , 1997, 36(9), 1967	Intermediate 33	415	2.82

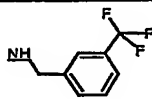
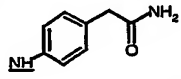
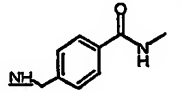
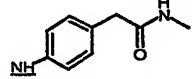
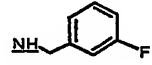
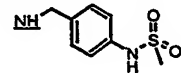
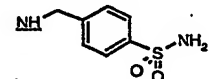
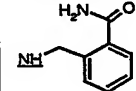
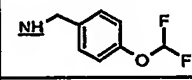
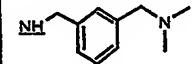
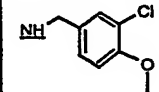
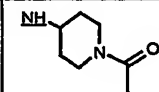
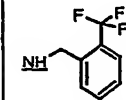
533		Aldrich	Intermediate 33	406	3.14
534		Peakdale Molecular Ltd.	Intermediate 33	451	2.71
535		Aldrich	Intermediate 33	406	3.15
536		Aldrich	Intermediate 33	406	3.15
537		<i>J. Med. Chem.</i> , 1999, 42(14), 2504	Intermediate 33	473	2.58
538		Chemical Building Blocks	Intermediate 33	422	2.92
540		Aldrich	Intermediate 33	451	2.13
541		Aldrich	Intermediate 33	436	3.15
542		Aldrich	Intermediate 33	408	2.85
544		Janssen Pharmaceuticals	Intermediate 33	449	2.67
545		Intermediate 69	Intermediate 33	444	2.34
546 (as H-C(O)OH salt = formic acid addition salt)		<i>Arzneimittel Forschung</i> , 1974, 24(4a), 584	Intermediate 33	430	1.95

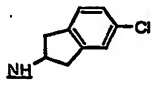
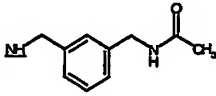
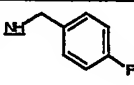
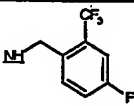
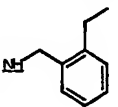
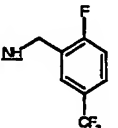
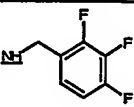
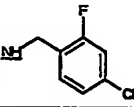
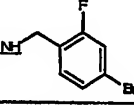
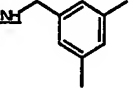
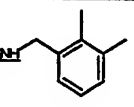
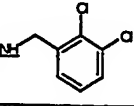
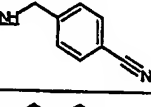
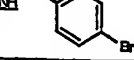
547		WO 97/25323	Intermediate 33	445	1.96
548 (as $\text{CF}_3\text{C}(\text{O})\text{OH}$ salt)		WO 03/32980	Intermediate 33	479	2.21
549 (as $\text{CF}_3\text{C}(\text{O})\text{OH}$ salt)		WO 03/32980	Intermediate 33	492	2.24
550 (as $\text{CF}_3\text{C}(\text{O})\text{OH}$ salt)		WO 02/85860	Intermediate 33	424	2.33
551		Salor	Intermediate 33	422	3.36
552		WO 95/00516	Intermediate 33	494	3.22
553 (as $\text{CF}_3\text{C}(\text{O})\text{OH}$ salt)		WO 03/32980	Intermediate 33	492	2.21
554		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	448	3.4
555		Aldrich	Intermediate 33	416	3.06
556		Salor	Intermediate 33	432	3.21
557		DE 2300018	Intermediate 33	458	3.12
558		Peakdale Molecular Ltd	Intermediate 33	436	3.41

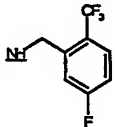
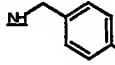
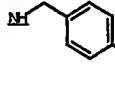
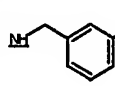
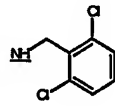
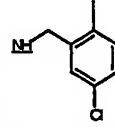
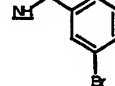
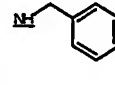
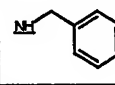
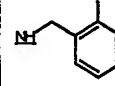
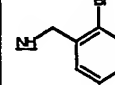
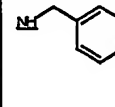
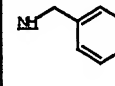
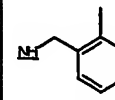
559 (as $\text{CF}_3\text{C}(\text{O})\text{OH}$ salt)		JP 10045736	Intermediate 33	463	2.28
560		WO 02/16318 EP 338793	Intermediate 33	487	2.74
561		Maybridge Chemical Company Ltd.	Intermediate 33	440	2.99
562		Lancaster	Intermediate 33	440	3.00
563		Aldrich	Intermediate 33	398	3.01
564		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	416	3.11
565		Aldrich; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	414	3.19
567		Aldrich	Intermediate 33	372	3.01
568		<i>J. Biol. Chem.</i> , 1997, 272(3), 1493	Intermediate 33	472	2.69
569		Fluorochem Ltd.	Intermediate 33	466	3.29
570		Intermediate 71	Intermediate 33	463	2.66
571		Maybridge Reactive intermediates	Intermediate 33	478	2.25

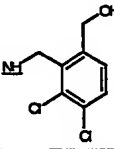
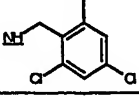
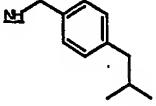
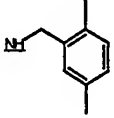
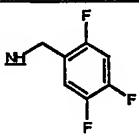
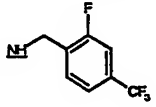
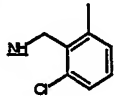
572		WO 99/67204	Intermediate 33	463	2.24
573		<i>Eur. J. Med. Chem.</i> , 1987, 22(5), 417	Intermediate 33	450	2.90
574		Lancaster	Intermediate 33	446/ 448/ 450	3.35
575		<i>Eur. J. Med. Chem.</i> , 1987, 33(5), 363	Intermediate 33	436	3.48
576		Avocado	Intermediate 33	416	3.06
577		WO 02/30930	Intermediate 33	458	2.80
578		Apin	Intermediate 33	458	2.80
579		Aldrich	Intermediate 33	458	2.80
580		Aldrich	Intermediate 33		
581		Lancaster; or <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	446/ 448/ 450	2.80
582		Aldrich	Intermediate 33	440	2.96
583		Aldrich	Intermediate 33	410	2.98
584		ICN Biomedicals, Inc.; or Salor; or <i>Synthesis</i> , 1982, 12, 1036	Intermediate 33	408	3.18

585		WO 03/32986	Intermediate 33	437	2.62
586		Aldrich	Intermediate 33	424	3.05
587		Aldrich	Intermediate 33	414/ 416	3.13
588		Buttpark	Intermediate 33	396	2.14
589		Aldrich	Intermediate 33	424	2.76
590		Lancaster	Intermediate 33	396	2.95
591		Aldrich; or Synlett, 1999, 4, 409	Intermediate 33	386	3.10
592		Aldrich	Intermediate 33		
593		Apin	Intermediate 33	438	2.82
594		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	448/ 450/ 452	3.26
595		WO 02/85860	Intermediate 33	423	2.29
596		Aldrich	Intermediate 33	416	3.0
597		Aldrich	Intermediate 33	423	2.56
598		Apin	Intermediate 33	396	2.54
599		WO 00/17163	Intermediate 33	411	2.72
600		Aldrich; or <i>J. Med. Chem.</i> , 2003,	Intermediate 33	381	1.89

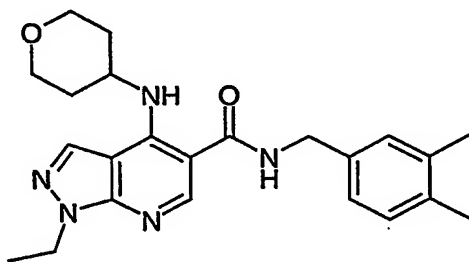
		46(4), 461.			
601		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	448	2.96
602		Peakdale Molecular Limited	Intermediate 33	423	2.28
603		WO 94/17035	Intermediate 33	437	2.28
604		<i>J. Pharm. Sci.</i> , 1987, 76(1), 18-20	Intermediate 33	437	2.34
605		Aldrich; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	398	2.71
606		Lis et al., <i>J. Med. Chem.</i> , 1990, 33(10), 2883, see Scheme III and ref. 24	Intermediate 33	473	2.40
607		Sigma	Intermediate 33	459	2.31
608		Peakdale Molecular Ltd.	Intermediate 33	423	2.55
609		Fluorochem Ltd.	Intermediate 33	446	2.82
610		DE 19937494	Intermediate 33	437	1.86
611		FluorochemL	Intermediate 33	444	2.80
612		WO00/72834	Intermediate 33	415	2.12
613		Aldrich	Intermediate 33	448	2.96

615		<i>J. Med. Chem.</i> , 2001, 44(26), 4628	Intermediate 33	440	3.03
616		Intermediate 75 (as HCl salt)	Intermediate 33	451	2.62
617		Aldrich; or <i>Organic Letters</i> , 2002, 4(12), 2055	Intermediate 33	398	2.90
618		Alfa	Intermediate 33	466	2.98
619		<i>Energy & Fuels</i> , (1994), 8(4), 990-1001	Intermediate 33	408	2.86
620		Alfa	Intermediate 33	466	2.94
621		Apollo	Intermediate 33	434	2.82
622		Acros	Intermediate 33	432	2.9
623		Acros	Intermediate 33	476	2.95
624		Apollo; or <i>Eur. J. Med. Chem.</i> , 1998, 33(5), 363	Intermediate 33	408	2.88
625		Maybridge	Intermediate 33	408	2.83
626		Lancaster	Intermediate 33	448	3.02
627		Apin	Intermediate 33	405	2.56
628		Ubi-Chem	Intermediate 33	458	2.89

629		ABCR	Intermediate 33	466	2.97
630		Lancaster	Intermediate 33	505.9	2.97
631		Apollo	Intermediate 33	436	3.11
632		WO 98/33767; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111.	Intermediate 33	405	2.55
633		Pfaltz-Bauer; or Meindl et al., <i>J. Med. Chem.</i> , 1984, 27(9), 1111	Intermediate 33	448	2.88
634		Transworld	Intermediate 33	428	3.22
635		Apin (used as HCl salt)	Intermediate 33	536	3.47
636		Matrix	Intermediate 33	408	3.18
637		Avocado	Intermediate 33	466	3.25
638		Pfaltz-Bauer	Intermediate 33	505.9	2.92
639		Alfa	Intermediate 33	458	3.10
640		WO 03/35621 (used as HCl salt)	Intermediate 33	410	2.49
641		WO 03/35621 (used as HCl salt)	Intermediate 33	410	2.51
642		DE 2136624 (used as HCl salt)	Intermediate 33	424	2.55

643		(used as HCl salt)	Intermediate 33	478	2.96
644		Aldrich	Intermediate 33	462	3.13
645			Intermediate 33	436	3.18
646		Matrix	Intermediate 33	408	2.84
647		Apollo	Intermediate 33	434	2.80
648		ABCR	Intermediate 33	466	2.99
649		Lancaster	Intermediate 33	428	2.87

Example 518: *N*-[(3,4-dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide; also known as: *N*-(3,4-dimethylbenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide

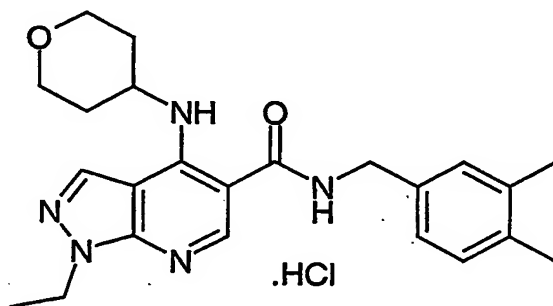


An alternative process for preparing Example 518 is given below:

To a solution of Intermediate 33 (3.5g, 12.07mmol) in DMF (500ml) was added HATU (4.5g, 12.07mmol) and the mixture stirred at room temperature for 30 min. 3,4-Dimethylbenzylamine (1.63g, 12.07mmol, obtainable from Matrix Scientific, Columbia, USA or by a process described in *Chem. Ber.*, 1969, 102, 2770) was added followed by DIPEA (4.5ml, 26.55mmol) and the solution stirred at room temperature

for 16 hours. The solvent was removed under reduced pressure and the residue partitioned between saturated aqueous NaHCO_3 (200ml) and ethyl acetate (250ml), the aqueous phase re-extracted with ethyl acetate (2x200ml), the organic extracts combined, dried (Na_2SO_4) and evaporated. The resultant viscous oil was recrystallised from hot ethyl acetate (ca. 100ml) to give the title compound as a white crystalline solid (3.36g, 80%). LCMS showed $\text{MH}^+ = 408$; $T_{\text{ret}} = 3.06\text{min}$. δ_{H} (D_6 DMSO) 1.36 (3H, t), 1.51 (2H, m), 2.00 (2H, m), 2.18 (3H, s), 2.19 (3H, s), 2.50 (2H, m), 3.61 (2H, m), 3.83 (2H, m), 4.17 (1H, m), 4.36 (2H, q), 4.38 (2H, d), 7.02-7.09 (3H, m), 8.17 (1H, s), 8.62 (1H, s), 8.93 (1H, t), 9.96 (1H, d); δ_{C} (D_6 DMSO) 14.65, 18.91, 19.33, 32.81, 41.06, 41.86, 48.57, 64.94, 101.69, 102.18, 124.44, 128.22, 129.24, 133.28, 134.31, 135.78, 136.91, 149.26, 149.59, 151.36, 168.81

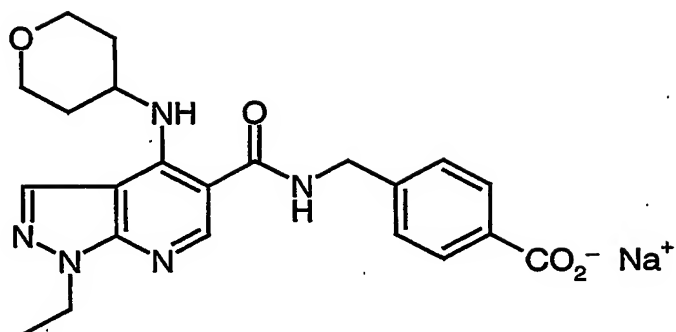
Example 518A: *N*-[(3,4-dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide hydrochloride; also known as: *N*-(3,4-dimethylbenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide hydrochloride



A solution of Example 518 (1.3g, 3.19mmol) in anhydrous tetrahydrofuran (200ml) was treated with a solution of hydrogen chloride in dioxane (4M, 8ml) and the mixture stirred at ambient temperature for 16 hours. The resultant white precipitate was collected by filtration and recrystallised from hot methanol (100ml) to give the title compound Example 518A as a white crystalline solid (1.12g, 79%).

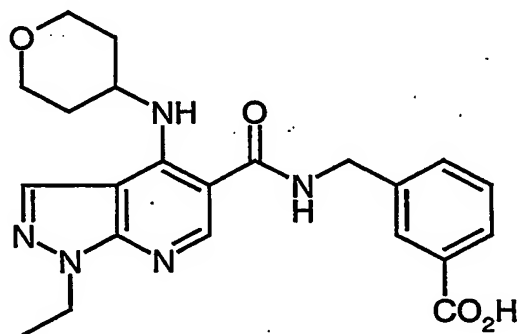
LCMS showed $\text{MH}^+ = 408$; $T_{\text{ret}} = 3.21\text{min}$. δ_{H} (D_6 DMSO) 1.39 (3H, t), 1.59 (2H, m), 2.01 (2H, m), 2.19 (3H, s), 2.20 (3H, s), 3.64 (2H, t), 3.83 (2H, m), 4.28 (1H, m), 4.40 (2H, d), 4.50 (2H, q), 7.04-7.11 (3H, m), 9.40 (1H, s (br)), 10.72 (1H, s (br)).

Example 650: 4-[(1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl)carbonylamino)methyl]benzoic acid sodium salt.



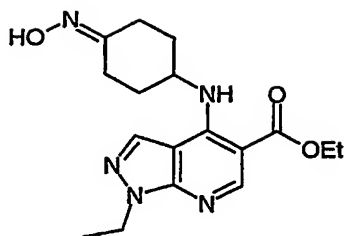
2M-Sodium hydroxide solution (98 μ L, 0.196mmol) was added to a stirred solution of Example 593 (22mg, 0.049mmol) in methanol (104 μ L) and water (6 μ L). The resulting solution was stirred at 50°C under nitrogen. After 16h, the reaction mixture was diluted with water (0.5ml) and adjusted to pH 4 with acetic acid. The mixture was extracted with ethyl acetate (2 x 0.5ml), and the combined extracts were dried (Na_2SO_4) and evaporated *in vacuo* to give a solid (15mg). This solid was suspended in water (0.5ml) and treated with 2M-sodium hydroxide solution (15 μ L). Evaporation of solvent *in vacuo* afforded Example 650 as a white solid (11mg). LCMS showed $\text{MH}^+ = 425$; $T_{\text{RET}} = 2.69\text{min}$.

Example 651: 3-[(1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonylamino)methyl]benzoic acid



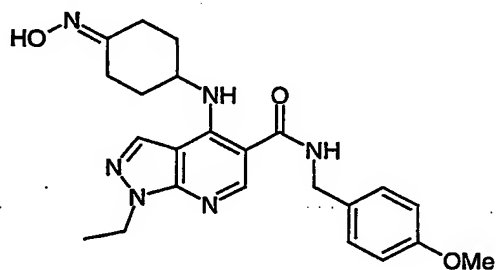
2M-Sodium hydroxide solution (98 μ L, 0.196mmol) was added to a stirred solution of Example 558 (22mg, 0.049mmol) in methanol (104 μ L) and water (6 μ L). The resulting solution was stirred at 50°C under nitrogen. After 16h, the reaction mixture was diluted with water (0.5ml) and adjusted to pH 4 with acetic acid. The precipitated solid was collected by filtration and dried *in vacuo* to afford Example 651 as a white solid (15mg). LCMS showed $\text{MH}^+ = 425$; $T_{\text{RET}} = 2.72\text{min}$.

Example 652: Ethyl 1-ethyl-4-{[4-(hydroxyimino)cyclohexyl]amino}-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



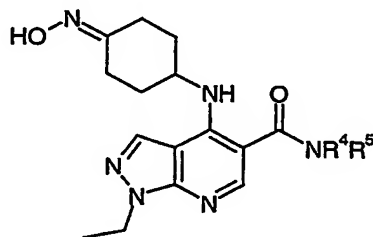
A mixture of Example 205 (200mg), hydroxylamine hydrochloride (50mg) and anhydrous potassium carbonate (420mg) in acetonitrile (10 ml) was stirred and heated at reflux for 17 hours. The solution was cooled and concentrated *in vacuo*. The residue was partitioned between EtOAc and water. The organic phase was separated, dried over Na₂SO₄ and concentrated *in vacuo* to give Example 652 as a white powder (203mg). LCMS showed MH⁺ = 346; T_{RET} = 2.84min.

Example 653: 1-Ethyl-4-[[4-(hydroxyimino)cyclohexyl]amino]-N-[[4-(methoxy)phenyl]methyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide

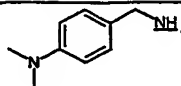


A mixture of Example 263 (217mg), hydroxylamine hydrochloride (43mg) and anhydrous potassium carbonate (355mg) in acetonitrile (10 ml) was stirred and heated at reflux for 17 hours. The solution was cooled and concentrated *in vacuo*. The residue was partitioned between EtOAc and water. The organic phase was separated, dried over Na₂SO₄ and concentrated *in vacuo* to give Example 653 as a yellow solid (186mg). LCMS showed MH⁺ = 437; T_{RET} = 2.82min.

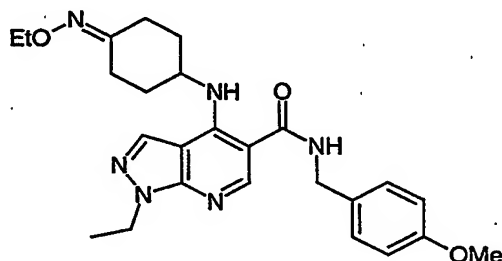
The following example was prepared by a similar procedure:



Example No.	NR ⁴ R ⁵	Source of HNR ⁴ R ⁵	Starting Material	MH + ion	LC-MC Retention time

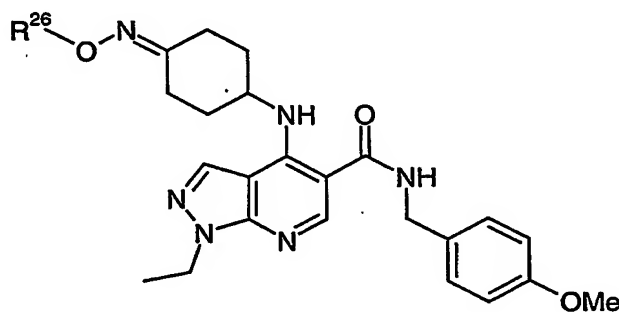
654		Aldrich	Example 619	450	2.35
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Example 655: 1-Ethyl-4-({4-[(ethoxy)imino]cyclohexyl}amino)-N-{{4-(methoxy)phenyl}methyl}-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide



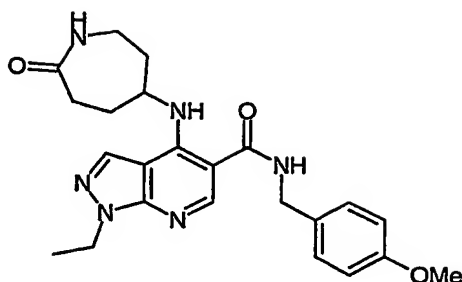
A mixture of Example 263 (25mg), ethoxyamine hydrochloride ($R^{26}ONH_2$ where $R^{26} = Et$, 20mg) and diisopropylethylamine (30mg) in acetonitrile (3 ml) was stirred and heated at reflux for 3.25 hours. The solution was cooled and concentrated *in vacuo*. The residue was applied to an SPE cartridge (5g). The cartridge was eluted with EtOAc. Fractions containing the desired product were concentrated *in vacuo* to give Example 655 as a colourless gum (20mg). LCMS showed $MH^+ = 465$; $T_{RET} = 3.28min$.

The following examples were prepared by a similar procedure:



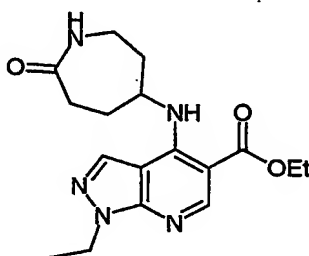
Example No.	R^{26}	Source of $R^{26}ONH_2$	Starting Material	MH^+ + ion	LC-MC Retention time
656	Me	Aldrich	Example 263	451	2.52
657	<i>t</i> Bu	Aldrich	Example 263	493	3.66

Example 658: 1-Ethyl-N-{{4-(methoxy)phenyl}methyl}-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-*b*]pyridine-5-carboxamide



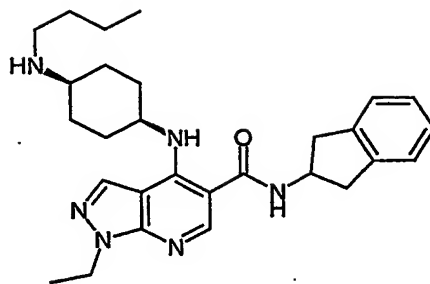
A suspension of cyanuric chloride (150mg) in DMF (0.2 ml) was stirred for 30 min. The suspension was diluted to 7ml with DMF, with stirring. A 1.0ml portion of the resultant suspension was removed and added to Example 653 (52mg). The resultant solution was stirred for 90 hours, then concentrated *in vacuo*. The residue was partitioned between EtOAc and water. The organic phase was separated and washed consecutively with saturated sodium carbonate, 10% w/v citric acid and saturated brine, dried over Na₂SO₄ and concentrated *in vacuo*. The residue was applied to an SPE cartridge (2g). The cartridge was eluted successively with EtOAc:cyclohexane (1:1), EtOAc and then a (100:8:1) mixture of dichloromethane, ethanol and ammonia. Fractions containing the desired product (eluted in the ammoniacal solution) were concentrated *in vacuo* to give Example 658 as a colourless oil (11mg). LCMS showed MH⁺ = 437; T_{RET} = 2.50min.

Example 659: Ethyl 1-ethyl-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate



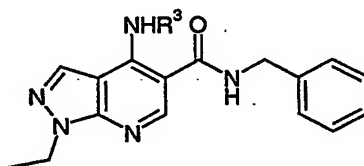
Example 659 was prepared from Example 652, using an identical procedure to that used for Example 658. LCMS showed MH⁺ = 346; T_{RET} = 2.56min.

Example 660: 4-[[*cis*-4-(Butylamino)cyclohexyl]amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide



A solution of Example 258 (25mg), butyraldehyde (5mg) and glacial acetic acid (30mg) in DCM (3ml) was stirred for 10min. Sodium triacetoxyborohydride (21mg) was added. The reaction mixture was stirred for 1.5 hours. Sodium bicarbonate (1.0Molar, 3ml) was added dropwise, with stirring. After stirring for 5 min. the phases were separated. The organic phase was dried over Na_2SO_4 and applied to an SPE cartridge (5g). The cartridge was eluted with a (100:8:1) mixture of dichloromethane, ethanol and ammonia. Fractions containing the desired product were concentrated *in vacuo* to give Example 660 as an amorphous, cream solid (19mg). LCMS showed $\text{MH}^+ = 346$; $T_{\text{RET}} = 2.56\text{min}$.

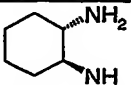
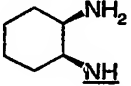
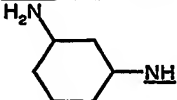
Examples 661 to 664



General Procedure:

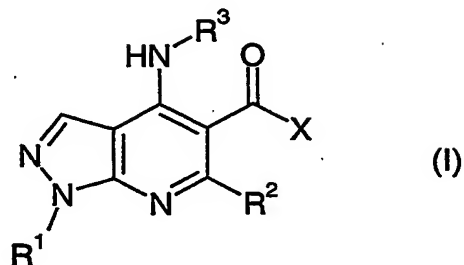
Intermediate 17 (0.16mmol) in acetonitrile (1ml) was treated with the R^3NH_2 amine (0.8mmol) in acetonitrile (1ml) and N,N-diisopropylethylamine (0.8mmol). The mixture was heated at 50°C for 18h then concentrated in *vacuo*. The residue was diluted with water (3ml) and extracted with dichloromethane (2 x 5ml). The combined organic extracts were evaporated, and the residue was purified by mass directed autoprep HPLC to give the desired product containing formic acid. This material was dissolved in chloroform-methanol (10/1, 5.5ml) and washed with 5% sodium hydrogen carbonate solution (1ml) to give after evaporation of solvents the pure product.

Example no.	NHR^3	Source of R^3NH_2	Starting Material	MH + ion	LC-MC Retention time
214		<i>J. Med. Chem.</i> , 1994, 37(17), 2360	Intermediate 17	393	2.16
661		Aldrich	Intermediate 17	393	2.16

662		Aldrich	Intermediate 17	393	2.29
663		Aldrich	Intermediate 17	393	2.30
664		Peakdale Molecular Ltd	Intermediate 17	393	2.21

CLAIMS

1. A compound of formula (I) or a salt thereof:

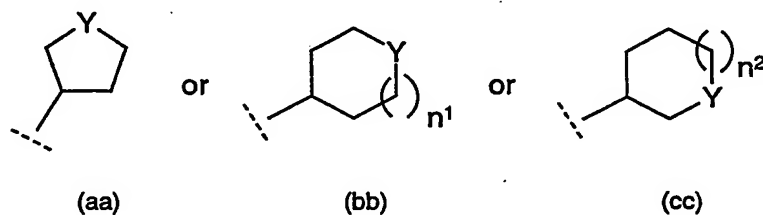


wherein:

R^1 is C_{1-4} alkyl, C_{1-3} fluoroalkyl, $-CH_2CH_2OH$ or $-CH_2CH_2CO_2C_{1-2}$ alkyl;

R^2 is a hydrogen atom (H), methyl or C_1 fluoroalkyl;

R^3 is optionally substituted C_{3-8} cycloalkyl or optionally substituted mono-unsaturated- C_{5-7} cycloalkenyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc);

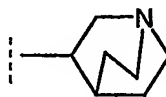


in which n^1 and n^2 independently are 1 or 2; and in which Y is O, S, SO_2 , or NR^{10} , where R^{10} is a hydrogen atom (H), C_{1-4} alkyl (e.g. methyl or ethyl), C_{1-2} fluoroalkyl, $CH_2C(O)NH_2$, $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl, $C(O)-C_1$ fluoroalkyl or $-C(O)-CH_2O-C_{1-2}$ alkyl;

and wherein in R^3 the C_{3-8} cycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents independently being oxo ($=O$); OH; C_{1-2} alkoxy; C_{1-2} fluoroalkoxy; NHR^{21} wherein R^{21} is a hydrogen atom (H) or C_{1-5} straight-chain alkyl; C_{1-2} alkyl; C_{1-2} fluoroalkyl; $-CH_2OH$; $-CH_2CH_2OH$; $-CH_2NHR^{22}$ wherein R^{22} is H or C_{1-2} alkyl; $-C(O)OR^{23}$ wherein R^{23} is H or C_{1-2} alkyl; $-C(O)NHR^{24}$ wherein R^{24} is H or C_{1-2} alkyl; $-C(O)R^{25}$ wherein R^{25} is C_{1-2} alkyl; fluoro; hydroxyimino ($=N-OH$); or $(C_{1-4}alkoxy)imino$

(=N-OR²⁶ where R²⁶ is C₁₋₄alkyl); and wherein any OH, alkoxy, fluoroalkoxy or NHR²¹ substituent is not substituted at the R³ ring carbon attached (bonded) to the -NH- group of formula (I) and is not substituted at either R³ ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc);

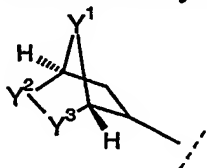
and wherein, when R³ is optionally substituted mono-unsaturated-C₅₋₇cycloalkenyl, then the cycloalkenyl is optionally substituted with one or two substituents being fluoro or C₁₋₂alkyl provided that if there are two substituents then they are not both C₂alkyl, and the R³ ring carbon bonded to the -NH- group of formula (I) does not partake in the cycloalkenyl double bond;



or R³ is a bicyclic group of sub-formula (dd):

(dd)

or of sub-formula (ee):



(ee)

wherein Y¹, Y² and Y³ independently are CH₂ or oxygen (O) provided that no more than one of Y¹, Y² and Y³ is oxygen (O);

and X is NR⁴R⁵ or OR^{5a}, in which:

R⁴ is a hydrogen atom (H); C₁₋₆alkyl; C₁₋₃fluoroalkyl; or C₂₋₆alkyl substituted by one substituent R¹¹; and

R⁵ is a hydrogen atom (H); C₁₋₈alkyl; C₁₋₈ fluoroalkyl; C₃₋₈cycloalkyl optionally substituted by a C₁₋₂alkyl group; or -(CH₂)_{n⁴}-C₃₋₈cycloalkyl optionally substituted, in the -(CH₂)_{n⁴}- moiety or in the C₃₋₈cycloalkyl moiety, by a C₁₋₂alkyl group, wherein n⁴ is 1, 2 or 3;

or R⁵ is C₂₋₆alkyl substituted by one or two independent substituents R¹¹;

wherein each substituent R¹¹, independently of any other R¹¹ substituent present, is: hydroxy (OH); C₁₋₆alkoxy; phenyloxy; benzyloxy; -NR¹²R¹³; -NR¹⁵-C(O)R¹⁶; -NR¹⁵-C(O)-O-R¹⁶; -NR¹⁵-C(O)-NH-R¹⁵; or -NR¹⁵-SO₂R¹⁶; and wherein any

R¹¹ substituent which is OH, alkoxy or -NR¹²R¹³ is not substituted at any carbon atom, of any R⁴ or R⁵ substituted alkyl, which is bonded to the nitrogen of NR⁴R⁵;

or R⁵ is -(CH₂)_n¹¹-C(O)R¹⁶; -(CH₂)_n¹²-C(O)NR¹²R¹³; -CHR¹⁹-C(O)NR¹²R¹³; -(CH₂)_n¹²-C(O)OR¹⁶; -(CH₂)_n¹²-C(O)OH; -CHR¹⁹-C(O)OR¹⁶; -CHR¹⁹-C(O)OH; -(CH₂)_n¹²-SO₂-NR¹²R¹³; -(CH₂)_n¹²-SO₂R¹⁶; or -(CH₂)_n¹²-CN; wherein n¹¹ is 0, 1, 2, 3 or 4 and n¹² is 1, 2, 3 or 4;

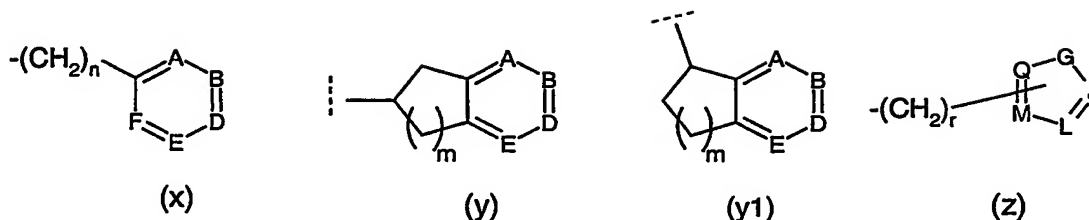
or R⁵ is -(CH₂)_n¹³-Het wherein n¹³ is 0, 1, 2, 3 or 4 and Het is a 4-, 5-, 6- or 7-membered saturated or partly-saturated heterocyclic ring containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-hetero-atoms present are not bound to the -(CH₂)_n¹³- moiety when n¹³ is 1 and are not bound to the nitrogen of NR⁴R⁵ when n¹³ is 0; wherein any ring-nitrogens which are present and which are not unsaturated (i.e. which do not partake in a double bond) are present as NR¹⁷ where R¹⁷ is as defined herein; and wherein one or two of the carbon ring-atoms independently are optionally substituted by C₁₋₂alkyl;

or R⁵ is phenyl optionally substituted with, independently, one, two or three of: a halogen atom; C₁₋₆alkyl; C₁₋₂fluoroalkyl; C₁₋₄alkoxy; C₁₋₂fluoroalkoxy; C₃₋₆cycloalkyloxy; -C(O)R^{16a}; -C(O)OR³⁰; -S(O)₂-R^{16a}; R^{16a}-S(O)₂-NR^{15a}; R⁷R⁸N-S(O)₂-; C₁₋₂alkyl-C(O)-R^{15a}N-S(O)₂-; C₁₋₄alkyl-S(O)-, Ph-S(O)-, R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶; R⁷R⁸N; OH; C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-S(O)₂-CH₂-; R⁷R⁸N-S(O)₂-CH₂-; C₁₋₂alkyl-S(O)₂-NR^{15a}-CH₂-; -CH₂-OH; -CH₂CH₂-OH; -CH₂-NR⁷R⁸; -CH₂-CH₂-NR⁷R⁸; -CH₂-C(O)OR³⁰; -CH₂-C(O)-NR⁷R⁸; -CH₂-NR^{15a}-C(O)-C₁₋₃alkyl; -(CH₂)_n¹⁴-Het¹ where n¹⁴ is 0 or 1; cyano (CN); Ar^{5a}; or phenyl, pyridinyl or pyrimidinyl wherein the phenyl, pyridinyl or pyrimidinyl independently are optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or where two adjacent substituents, on the R⁵ optionally substituted phenyl, taken together are -O-(CMe₂)-O- or -O-(CH₂)_n¹⁴-O- where n¹⁴ is 1 or 2;

wherein R⁷ and R⁸ are independently a hydrogen atom (H); C₁₋₄alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or R⁷ and R⁸ together are -(CH₂)_n⁶- or -C(O)-(CH₂)_n⁷- or -C(O)-(CH₂)_n⁷-C(O)- or -(CH₂)_n⁸-X⁷-(CH₂)_n⁹- or -C(O)-X⁷-(CH₂)_n¹⁰- in which: n⁶ is 3, 4, 5 or 6, n⁷ is 2, 3, 4, or 5, n⁸ and n⁹ and n¹⁰ independently are 2 or 3, and X⁷ is O or NR¹⁴ wherein R¹⁴ is H, C₁₋₂alkyl or C(O)Me;

or R⁵ has the sub-formula (x), (y), (y1) or (z):



wherein in sub-formula (x), $n = 0, 1$ or 2 ; in sub-formula (y) and (y1), $m = 1$ or 2 ; and in sub-formula (z), $r = 0, 1$ or 2 ;

wherein in sub-formula (x) and (y) and (y1), none, one or two of A, B, D, E and F are independently nitrogen or nitrogen-oxide (N^+-O^-) provided that no more than one of A, B, D, E and F is nitrogen-oxide; and the remaining of A, B, D, E and F are independently CH or CR⁶;

provided that when n is 0 in sub-formula (x) then one or two of A, B, D, E and F are independently nitrogen or nitrogen-oxide (N^+-O^-) and no more than one of A, B, D, E and F is nitrogen-oxide;

wherein, each R⁶, independently of any other R⁶ present, is: a halogen atom; C₁₋₆alkyl; C₁₋₄fluoroalkyl; C₁₋₄alkoxy; C₁₋₂fluoroalkoxy; C₃₋₆cycloalkyloxy; -C(O)R^{16a}; -C(O)OR³⁰; -S(O)₂-R^{16a}; R^{16a}-S(O)₂-NR^{15a}; R⁷R⁸N-S(O)₂-; C₁₋₂alkyl-C(O)-R^{15a}N-S(O)₂-; C₁₋₄alkyl-S(O)-, Ph-S(O)-, R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶; R⁷R⁸N; OH; C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-S(O)₂-CH₂-; R⁷R⁸N-S(O)₂-CH₂-; C₁₋₂alkyl-S(O)₂-NR^{15a}-CH₂-; -CH₂-OH; -CH₂CH₂-OH; -CH₂-NR⁷R⁸; -CH₂-CH₂-NR⁷R⁸; -CH₂-C(O)OR³⁰; -CH₂-C(O)-NR⁷R⁸; -CH₂-NR^{15a}-C(O)-C₁₋₃alkyl; -(CH₂)_{n¹⁴}-Het¹ where n^{14} is 0 or 1; cyano (CN); Ar^{5b}; or phenyl, pyridinyl or pyrimidinyl wherein the phenyl, pyridinyl or pyrimidinyl independently are optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or where two adjacent R⁶ taken together are -O-(CMe₂)-O- or -O-(CH₂)_{n¹⁴}-O- where n^{14} is 1 or 2;

wherein R⁷ and R⁸ are as herein defined;

wherein sub-formula (y) and (y1), independently, are optionally substituted by oxo (=O) at a ring carbon adjacent the 6-membered aromatic ring;

wherein in sub-formula (z), G is O or S or NR⁹ wherein R⁹ is a hydrogen atom (H), C₁₋₄alkyl or C₁₋₄fluoroalkyl; none, one, two or three of J, L, M and Q are nitrogen;

and the remaining of J, L, M and Q are independently CH or CR⁶ where R⁶, independently of any other R⁶ present, is as defined herein;

or R⁴ and R⁵ taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$ or $-(CH_2)_{p^3}-X^5-(CH_2)_{p^4}-$ or $-C(O)-X^5-(CH_2)_{p^5}-$, in which: $p^1 = 3, 4, 5$ or 6 , p^2 is $2, 3, 4$, or 5 , and p^3 and p^4 and p^5 independently are 2 or 3 and X^5 is O or NR¹⁷; and wherein, when R⁴ and R⁵ taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$, the NR⁴R⁵ heterocycle is optionally substituted by one R¹⁸ substituent wherein R¹⁸ is: C₁₋₄alkyl; C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; C₁₋₂alkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); C₁fluoroalkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); OH (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); $-(CH_2)_{p^7}-C(O)R^{16}$ wherein p^7 is $0, 1, 2$ or 3 ; $-(CH_2)_{p^7}-C(O)OR^{16}$; $-(CH_2)_{p^7}-OC(O)R^{16}$; $-(CH_2)_{p^7}-C(O)NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}C(O)R^{16}$; $-(CH_2)_{p^7}-NR^{15}C(O)NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}C(O)OR^{16}$; $-(CH_2)_{p^7}-SO_2R^{16}$; $-(CH_2)_{p^7}-SO_2NR^{12}R^{13}$; $-(CH_2)_{p^7}-NR^{15}SO_2R^{16}$; $-(CH_2)_{p^7}-OH$; $-(CH_2)_{p^7}-OR^{16}$; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R⁴ and R⁵ taken together are $-(CH_2)_{p^1}-$ or $-C(O)-(CH_2)_{p^2}-$ or $-(CH_2)_{p^3}-X^5-(CH_2)_{p^4}-$ or $-C(O)-X^5-(CH_2)_{p^5}-$ as defined herein, and wherein the NR⁴R⁵ heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

R^{5a} is C₁₋₈alkyl; C₁₋₈fluoroalkyl; C₃₋₈cycloalkyl; $-(CH_2)_n^{4a}-C_{3-6}$ cycloalkyl wherein n^{4a} is 1 or 2 ; phenyl optionally substituted with one or two of: a halogen atom, C₁₋₂alkyl, trifluoromethyl, C₁₋₂alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula (x), (y), (y1) or (z) as defined herein

and wherein:

R¹² and R¹³ independently are H; C₁₋₅alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R¹² and R¹³ together are $-(CH_2)_n^{6-}$ or $-C(O)-(CH_2)_n^{7-}$ or $-C(O)-(CH_2)_n^{7-}C(O)-$ or $-(CH_2)_n^{8-}X^{12}-(CH_2)_n^{9-}$ or $-C(O)-X^{12}-(CH_2)_n^{10-}$ in which: n^6 is 3, 4, 5 or 6, n^7 is 2, 3, 4, or 5, n^8 and n^9 and n^{10} independently are 2 or 3 and X¹² is O or NR^{14a} wherein R^{14a} is H, C₁₋₂alkyl or C(O)Me;

R¹⁵ is a hydrogen atom (H); C₁₋₄alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

R^{15a}, independent of other R^{15a}, is a hydrogen atom (H) or C₁₋₄alkyl;

R¹⁶ and R^{16a} independently are:

C₁₋₆alkyl (e.g. C₁₋₄alkyl or C₁₋₂alkyl);

C₃₋₆cycloalkyl (e.g. C₅₋₆cycloalkyl) optionally substituted by one oxo (=O), OH or C₁₋₂alkyl substituent;

C₃₋₆cycloalkyl-CH₂-;

pyridinyl optionally substituted on a ring carbon atom by one of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

Ar^{5c};

phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

benzyl optionally substituted at an aromatic carbon atom by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or

a 4-, 5-, 6- or 7-membered saturated heterocyclic ring connected at a ring-carbon and containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-nitrogens which are present are present as NR²⁷ where R²⁷ is H, C₁₋₂alkyl or -C(O)Me; and wherein the ring is optionally substituted at carbon by one C₁₋₂alkyl or oxo (=O) substituent, provided that any oxo (=O) substituent is substituted at a ring-carbon atom bonded to a ring-nitrogen;

wherein Ar^{5a}, Ar^{5b} and Ar^{5c} independently is/are a 5-membered aromatic heterocyclic ring containing one O, S or NR^{15a} in the 5-membered ring, wherein the 5-membered ring can optionally additionally contain one or two N atoms, and wherein the heterocyclic ring is optionally substituted on a ring carbon atom by one of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, -CH₂OH, -CH₂-OC₁₋₂alkyl, OH (including the keto tautomer thereof) or -CH₂-NR²⁸R²⁹ wherein R²⁸ and R²⁹ independently are H or methyl;

and R¹⁷ is a hydrogen atom (H); C₁₋₄alkyl; C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; $-(CH_2)_p^6-C(O)R^{16}$ wherein p^6 is 0, 1, 2 or 3; $-(CH_2)_p^6-C(O)NR^{12}R^{13}$;

$-(CH_2)_p^6-C(O)OR^{16}$; $-(CH_2)_p^6-C(O)OH$; $-SO_2R^{16}$; $-C(O)-CH_2-NR^{12}R^{13}$;
 $-C(O)-CH_2-NR^{15a}-C(O)-C_{1-3}alkyl$; $-C(O)-CH_2-O-C_{1-3}alkyl$; or phenyl or benzyl
 wherein the phenyl or benzyl is optionally substituted at an aromatic carbon atom by
 one or two of: a halogen atom, $C_{1-2}alkyl$, $C_1fluoroalkyl$, $C_{1-2}alkoxy$ or
 $C_1fluoroalkoxy$;

R^{19} is $C_{1-4}alkyl$; $-(CH_2)_n^{20}-OR^{20}$ wherein n^{20} is 1, 2, 3 or 4 and R^{20} is a hydrogen
 atom (H) or $C_{1-4}alkyl$; $-CH(Me)-OH$; $-CH_2-SH$; $-CH_2-CH_2-S-Me$; benzyl; or
 (4-hydroxyphenyl)methyl (i.e. 4-hydroxy-benzyl); and

R^{30} , independent of other R^{30} , is a hydrogen atom (H), $C_{1-4}alkyl$ or $C_{3-6}cycloalkyl$;
 and

Het¹, independent of other Het¹, is a 4-, 5-, 6- or 7-membered saturated heterocyclic
 ring connected at a ring-carbon and containing one or two ring-hetero-atoms
 independently selected from O, S, and N; wherein any ring-nitrogens which are
 present are present as NR^{31} where R^{31} is H, $C_{1-2}alkyl$ or $-C(O)Me$; and wherein the
 ring is optionally substituted at carbon by one $C_{1-2}alkyl$ or oxo (=O) substituent,
 provided that any oxo (=O) substituent is substituted at a ring-carbon atom bonded to
 a ring-nitrogen;

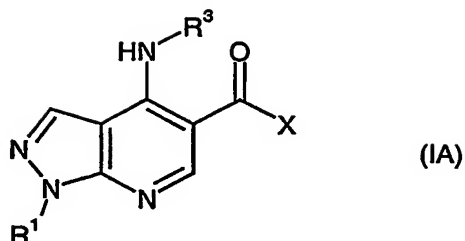
provided that:

when R^3 is the heterocyclic group of sub-formula (bb), n^1 is 1, and Y is NR^{10} , then:
 either (a) R^{10} is not $C_{1-4}alkyl$, $C_{1-2}fluoroalkyl$ or $CH_2C(O)NH_2$;

or (b) R^{10} is methyl and the compound is: ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-
 ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate, 1-ethyl-N-(2-ethylbutyl)-4-[(1-
 methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, 1-ethyl-N-
 (4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-
 carboxamide, or N-benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-
 pyrazolo[3,4-b]pyridine-5-carboxamide;

and provided that: where X is OR^{5a} , the compound is other than the compound
 wherein R^1 is methyl, X is OEt, and R^3 is cyclopentyl.

2. A compound of formula (IA) or a salt thereof:



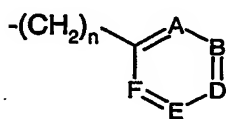
wherein:

X is NR^4R^5 or OR^{5a} , in which:

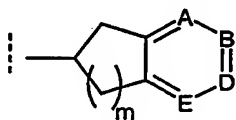
R^4 is hydrogen, C_{1-2} alkyl or C_{1-2} fluoroalkyl, and

R^5 is hydrogen, C_{1-8} alkyl, C_{1-8} fluoroalkyl, or C_{3-8} cycloalkyl, phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl,

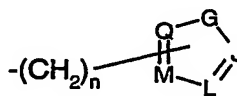
C_{1-2} alkoxy or trifluoromethoxy; or R^5 has the sub-formula (x), (y) or (z):



(x)



(y)



(z)

wherein in sub-formula (x) and (z), $n = 1$ or 2 ; and in sub-formula (y), $m = 1$ or 2 ;

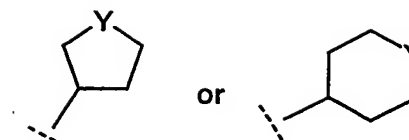
wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are CH or CR^6 where R^6 is a halogen atom, C_{1-4} alkyl, C_{1-4} fluoroalkyl, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy,

C_{1-2} alkylsulphonyl (C_{1-2} alkyl- SO_2 -), C_{1-2} alkyl- SO_2 -NH-, $\text{R}^7\text{R}^8\text{N-SO}_2$ -, $\text{R}^7\text{R}^8\text{N-CO-}$, $\text{R}^7\text{R}^8\text{N}$, OH, C_{1-4} alkoxymethyl, or C_{1-2} alkyl- SO_2 - CH_2 -, wherein R^7 and R^8 are independently hydrogen or C_{1-2} alkyl;

wherein in sub-formula (z), G is O or S or NR^9 wherein R^9 is C_{1-4} alkyl or C_{1-4} fluoroalkyl; none, one or two of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are CH or CR^6 where R^6 is as defined herein;

or R^4 and R^5 taken together are $-(\text{CH}_2)_p-$ where $p = 3, 4$ or 5 (preferably $p = 4$);

R^{5a} is C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl; phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula (x), (y) or (z) as defined herein;

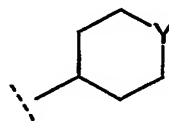


R^3 is C_{3-8} cycloalkyl or a heterocyclic group being in which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is hydrogen, C_{1-4} alkyl, C_{1-2} fluoroalkyl, $C(O)-C_{1-2}$ alkyl, or $C(O)-CF_3$;

and wherein in R^3 the C_{3-8} cycloalkyl or heterocyclic group is optionally substituted with one or two substituents being OH, C_{1-2} alkoxy, trimethoxy, or C_{1-2} alkyl group; and wherein any OH, alkoxy or trimethoxy substituent is not substituted at the ring carbon attached to the -NH- group of formula (IA) and is not substituted at either ring carbon bonded to the Y group of the heterocyclic group; and

$R^1 = C_{1-4}$ alkyl or C_{1-2} fluoroalkyl;

provided that:



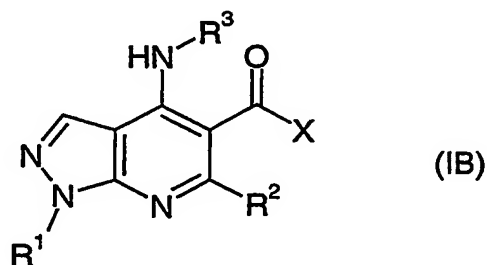
when R^3 is the heterocyclic group being and Y is NR^{10} , then:

either (a) R^{10} is hydrogen, $C(O)-C_{1-2}$ alkyl, or $C(O)-CF_3$;

or (b) R^{10} is methyl and the compound is: ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate, 1-ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, 1-ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, or N-benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide;

and provided that: where X is OR^{5a} , the compound is other than the compound wherein R^1 is methyl, X is OEt, and R^3 is cyclopentyl.

3. A compound of formula (IB) or a salt thereof:

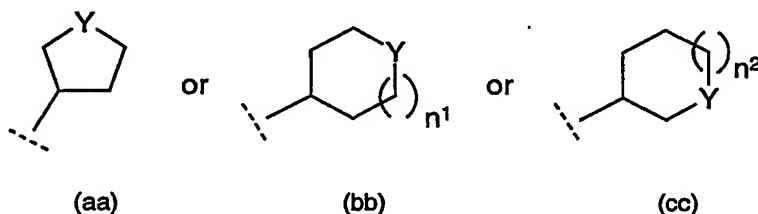


wherein:

R^1 is C_{1-4} alkyl, C_{1-3} fluoroalkyl, $-CH_2CH_2OH$ or $-CH_2CH_2CO_2C_{1-2}$ alkyl;

R^2 is a hydrogen atom (H), methyl or C_1 fluoroalkyl;

R^3 is optionally substituted C_{3-8} cycloalkyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc);



in which n^1 and n^2 independently are 1 or 2; and in which Y is O, S, SO_2 , or NR^{10} ; where R^{10} is a hydrogen atom (H), C_{1-4} alkyl, C_{1-2} fluoroalkyl, $CH_2C(O)NH_2$, $C(O)NH_2$, $C(O)-C_{1-2}$ alkyl, or $C(O)-C_1$ fluoroalkyl;

and wherein in R^3 the C_{3-8} cycloalkyl or the heterocyclic group of sub-formula (aa), (bb) or (cc) is optionally substituted with one or two substituents being oxo ($=O$), OH, C_{1-2} alkoxy, C_{1-2} fluoroalkoxy, or C_{1-2} alkyl; and wherein any OH, alkoxy or fluoroalkoxy substituent is not substituted at the R^3 ring carbon attached (bonded) to the $-NH-$ group of formula (IB) and is not substituted at either R^3 ring carbon bonded to the Y group of the heterocyclic group (aa), (bb) or (cc);

and X is NR^4R^5 or OR^{5a} , in which:

R^4 is a hydrogen atom (H); C_{1-6} alkyl; C_{1-3} fluoroalkyl; or C_{2-6} alkyl substituted by one substituent R^{11} ; and

R^5 is a hydrogen atom (H); C_{1-8} alkyl; C_{1-8} fluoroalkyl; C_{3-8} cycloalkyl optionally substituted by a C_{1-2} alkyl group; or $-(CH_2)_{n^4}-C_{3-8}$ cycloalkyl optionally substituted, in the $-(CH_2)_{n^4}-$ moiety or in the C_{3-8} cycloalkyl moiety, by a C_{1-2} alkyl group, wherein n^4 is 1, 2 or 3;

or R^5 is C_{2-6} alkyl substituted by one or two independent substituents R^{11} ;

wherein each substituent R^{11} , independently of any other R^{11} substituent present, is: hydroxy (OH); C_{1-6} alkoxy; phenoxy; benzyloxy; $-NR^{12}R^{13}$; $-NR^{15}-C(O)R^{16}$;

-NR¹⁵-C(O)-O-R¹⁶; -NR¹⁵-C(O)-NH-R¹⁵; or -NR¹⁵-SO₂R¹⁶; and wherein any R¹¹ substituent which is OH, alkoxy or -NR¹²R¹³ is not substituted at any carbon atom, of any R⁴ or R⁵ substituted alkyl, which is bonded to the nitrogen of NR⁴R⁵;

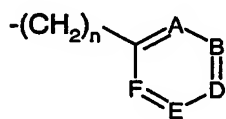
or R⁵ is -(CH₂)_n¹¹-C(O)R¹⁶; -(CH₂)_n¹¹-C(O)NR¹²R¹³; -CHR¹⁹-C(O)NR¹²R¹³; -(CH₂)_n¹²-C(O)OR¹⁶; -CHR¹⁹-C(O)OR¹⁶; -(CH₂)_n¹²-SO₂-NR¹²R¹³; -(CH₂)_n¹²-SO₂R¹⁶; or -(CH₂)_n¹²-CN; wherein n¹¹ is 0, 1, 2, 3 or 4 and n¹² is 1, 2, 3 or 4;

or R⁵ is -(CH₂)_n¹³-Het wherein n¹³ is 0, 1, 2, 3 or 4 and Het is a 4-, 5-, 6- or 7-membered saturated or partly-saturated heterocyclic ring containing one or two ring-hetero-atoms independently selected from O, S, and N; wherein any ring-hetero-atoms present are not bound to the -(CH₂)_n¹³- moiety when n¹³ is 1 and are not bound to the nitrogen of NR⁴R⁵ when n¹³ is 0; wherein any ring-nitrogens which are present and which are not unsaturated (i.e. which do not partake in a double bond) are present as NR¹⁷ where R¹⁷ is as defined herein; and wherein one or two of the carbon ring-atoms independently are optionally substituted by C₁₋₂alkyl;

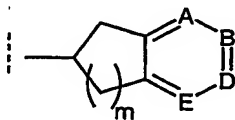
or R⁵ is phenyl optionally substituted with one or two of: a halogen atom; C₁₋₄alkyl; C₁₋₂fluoroalkyl; C₁₋₄alkoxy; C₁₋₂fluoroalkoxy; C₁₋₂alkylsulphonyl (C₁₋₂alkyl-SO₂-); C₁₋₂alkyl-SO₂-NH-; R⁷R⁸N-SO₂-; R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶; R⁷R⁸N; OH; C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-SO₂-CH₂-; cyano (CN); or phenyl optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

wherein R⁷ and R⁸ are independently a hydrogen atom (H); C₁₋₄alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; or R⁷ and R⁸ together are -(CH₂)_n⁶- or -C(O)-(CH₂)_n⁷- or -C(O)-(CH₂)_n⁷-C(O)- or -(CH₂)_n⁸-X⁷-(CH₂)_n⁹- or -C(O)-X⁷-(CH₂)_n¹⁰- in which: n⁶ is 3, 4, 5 or 6, n⁷ is 2, 3, 4, or 5, n⁸ and n⁹ and n¹⁰ independently are 2 or 3, and X⁷ is O or NR¹⁴ wherein R¹⁴ is H or C₁₋₂alkyl;

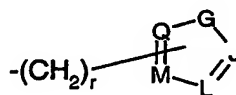
or R⁵ has the sub-formula (x), (y) or (z):



(x)



(y)



(z)

wherein in sub-formula (x), $n = 1$ or 2 ; in sub-formula (y), $m = 1$ or 2 ; and in sub-formula (z), $r = 0, 1$ or 2 ;

wherein in sub-formula (x) and (y), none, one or two of A, B, D, E and F are nitrogen; and the remaining of A, B, D, E and F are independently CH or CR⁶;

where R⁶ is a halogen atom; C₁₋₄alkyl; C₁₋₄fluoroalkyl; C₁₋₄alkoxy; C₁₋₂fluoroalkoxy; C₁₋₂alkylsulphonyl (C₁₋₂alkyl-SO₂-); C₁₋₂alkyl-SO₂-NH-; R⁷R⁸N-SO₂-; R⁷R⁸N-CO-; -NR¹⁵-C(O)R¹⁶; R⁷R⁸N; OH; C₁₋₄alkoxymethyl; C₁₋₄alkoxyethyl; C₁₋₂alkyl-SO₂-CH₂-; cyano (CN); or phenyl optionally substituted by one or two of fluoro, chloro, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; wherein R⁷ and R⁸ are as herein defined;

wherein in sub-formula (z), G is O or S or NR⁹ wherein R⁹ is a hydrogen atom (H), C₁₋₄alkyl or C₁₋₄fluoroalkyl; none, one, two or three of J, L, M and Q are nitrogen; and the remaining of J, L, M and Q are independently CH or CR⁶ where R⁶ is as defined herein;

or R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²- or -(CH₂)_p³-X⁵-(CH₂)_p⁴- or -C(O)-X⁵-(CH₂)_p⁵-, in which: p¹ = 3, 4, 5 or 6, p² is 2, 3, 4, or 5, and p³ and p⁴ and p⁵ independently are 2 or 3 and X⁵ is O or NR¹⁷;

wherein R¹⁷ is a hydrogen atom (H); C₁₋₄alkyl; C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; -(CH₂)_p⁶-C(O)R¹⁶ wherein p⁶ is 0, 1, 2 or 3; -(CH₂)_p⁶-C(O)NR¹²R¹³; -(CH₂)_p⁶-C(O)OR¹⁶; -SO₂R¹⁶; or phenyl or benzyl wherein the phenyl or benzyl is optionally substituted at an aromatic carbon atom by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

and wherein, when R⁴ and R⁵ taken together are -(CH₂)_p¹- or -C(O)-(CH₂)_p²-, the NR⁴R⁵ heterocycle is optionally substituted by one R¹⁸ substituent wherein R¹⁸ is: C₁₋₄alkyl; C₁₋₂fluoroalkyl; C₃₋₆cycloalkyl; C₁₋₂alkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); C₁fluoroalkoxy (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); OH (not substituted at a ring-carbon bonded to the NR⁴R⁵ ring-nitrogen); -(CH₂)_p⁷-C(O)R¹⁶ wherein p⁷ is 0, 1, 2 or 3; -(CH₂)_p⁷-C(O)OR¹⁶; -(CH₂)_p⁷-OC(O)R¹⁶; -(CH₂)_p⁷-C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)R¹⁶; -(CH₂)_p⁷-NR¹⁵C(O)NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵C(O)OR¹⁶; -(CH₂)_p⁷-SO₂R¹⁶; -(CH₂)_p⁷-SO₂NR¹²R¹³; -(CH₂)_p⁷-NR¹⁵SO₂R¹⁶; -(CH₂)_p⁷-OH; -(CH₂)_p⁷-OR¹⁶;

or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R⁴ and R⁵ taken together are $-(CH_2)_p^1-$ or $-C(O)-(CH_2)_p^2-$ or $-(CH_2)_p^3-X^5-(CH_2)_p^4-$ or $-C(O)-X^5-(CH_2)_p^5-$ as defined herein, and wherein the NR⁴R⁵ heterocycle is fused to a phenyl ring optionally substituted on the phenyl by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

R^{5a} is C₁₋₈alkyl; C₁₋₈ fluoroalkyl; C₃₋₈cycloalkyl; phenyl optionally substituted with one or two of: a halogen atom, C₁₋₂alkyl, trifluoromethyl, C₁₋₂alkoxy or trifluoromethoxy; or R^{5a} has the sub-formula (x), (y) or (z) as defined herein

and wherein:

R¹² and R¹³ independently are H; C₁₋₅alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

or R¹² and R¹³ together are $-(CH_2)_n^6-$ or $-C(O)-(CH_2)_n^7-$ or $-C(O)-(CH_2)_n^7-C(O)-$ or $-(CH_2)_n^8-X^{12}-(CH_2)_n^9-$ or $-C(O)-X^{12}-(CH_2)_n^{10}-$ in which: n⁶ is 3, 4, 5 or 6, n⁷ is 2, 3, 4, or 5, n⁸ and n⁹ and n¹⁰ independently are 2 or 3 and X¹² is O or NR¹⁴ wherein R¹⁴ is H or C₁₋₂alkyl;

R¹⁵ is a hydrogen atom (H); C₁₋₄alkyl; C₃₋₆cycloalkyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy;

R¹⁶ is C₁₋₄alkyl; C₃₋₆cycloalkyl; pyridinyl; or phenyl optionally substituted by one or two of: a halogen atom, C₁₋₂alkyl, C₁fluoroalkyl, C₁₋₂alkoxy or C₁fluoroalkoxy; and

R¹⁹ is a hydrogen atom (H); C₁₋₄alkyl; $-(CH_2)_n^{20}-OR^{20}$ wherein n²⁰ is 1, 2, 3 or 4 and R²⁰ is a hydrogen atom (H) or C₁₋₄alkyl; $-CH(Me)-OH$; $-CH_2-SH$; $-CH_2-CH_2-S-Me$; benzyl; or (4-hydroxyphenyl)methyl (i.e. 4-hydroxy-benzyl);

provided that:

when R³ is the heterocyclic group of sub-formula (bb), n¹ is 1, and Y is NR¹⁰, then: either (a) R¹⁰ is not C₁₋₄alkyl, C₁₋₂fluoroalkyl or CH₂C(O)NH₂;

or (b) R¹⁰ is methyl and the compound is: ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate, 1-ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, 1-ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, or N-benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide;

and provided that: where X is OR^{5a}, the compound is other than the compound wherein R¹ is methyl, X is OEt, and R³ is cyclopentyl.

4. A compound or salt as claimed in claim 1 or 3, wherein R² is a hydrogen atom (H).
5. A compound or salt as claimed in claim 1, 2, 3 or 4, wherein R¹ is C₁₋₃alkyl, C₁₋₂fluoroalkyl or -CH₂CH₂OH.
6. A compound or salt as claimed in any preceding claim, wherein R¹ is ethyl, n-propyl, C₂fluoroalkyl or -CH₂CH₂OH.
7. A compound or salt as claimed in any preceding claim, wherein R¹ is ethyl.
8. A compound or salt as claimed in any preceding claim, wherein in R³ there is one substituent or no substituent.
9. A compound or salt as claimed in any preceding claim, wherein, where R³ is optionally substituted C₃₋₈cycloalkyl, then R³ is not optionally substituted C₅cycloalkyl, i.e. it is not optionally substituted cyclopentyl.
10. A compound or salt as claimed in claim 9, wherein, where R³ is optionally substituted C₃₋₈cycloalkyl, then R³ is optionally substituted C₆₋₈cycloalkyl.
11. A compound or salt as claimed in claim 9, wherein, where R³ is optionally substituted C₃₋₈cycloalkyl, then R³ is optionally substituted cyclohexyl.
12. A compound or salt as claimed in any preceding claim, wherein, where R³ is optionally substituted C₃₋₈cycloalkyl, then the one or two optional substituents is or independently are: oxo (=O); OH; NHR²¹ wherein R²¹ is a hydrogen atom (H); methyl; -CH₂F; -CHF₂; -C(O)OR²³ wherein R²³ is H; fluoro; hydroxyimino (=N-OH); or (C₁₋₂alkoxy)imino (=N-OR²⁶ where R²⁶ is C₁₋₂alkyl).

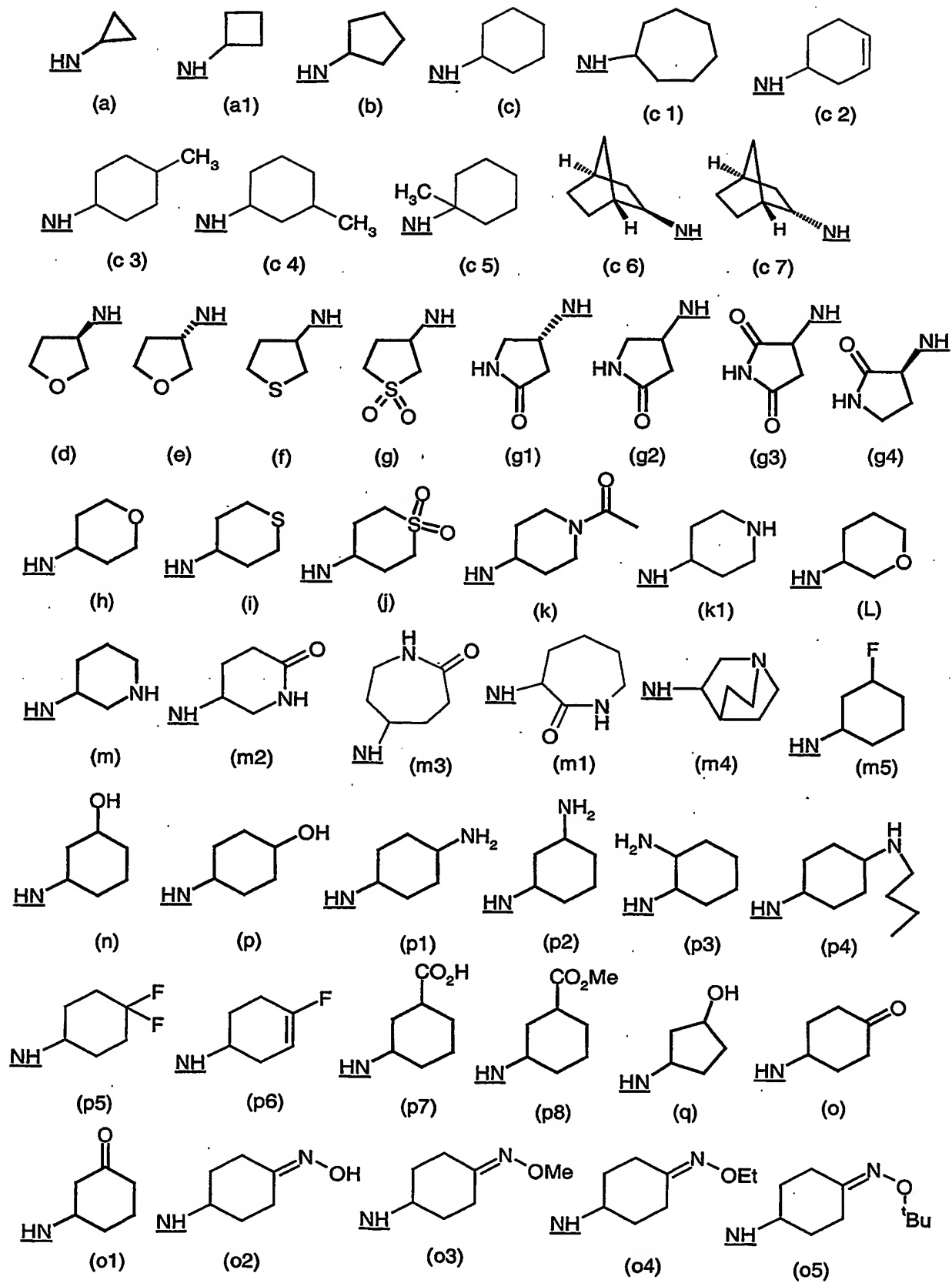
13. A compound or salt as claimed in any preceding claim, wherein, where R^3 is optionally substituted C_{3-8} cycloalkyl, then the one or two optional substituents is or independently are OH, oxo (=O) or hydroxyimino (=N-OH).
14. A compound or salt as claimed in any preceding claim, wherein, where R^3 is optionally substituted C_{3-8} cycloalkyl, then the one or two optional substituents if present is or are substituent(s) at the 3-, 4- or 5- position(s) of the R^3 cycloalkyl ring, (wherein the 1-position of the R^3 cycloalkyl ring is deemed to be the connection point to the -NH- in formula (I) or (IA) or (IB)).
15. A compound or salt as claimed in any preceding claim, wherein, where R^3 is optionally substituted C_6 cycloalkyl, then R^3 is cyclohexyl (i.e. unsubstituted), 3-hydroxy-cyclohexyl (i.e. 3-hydroxycyclohexan-1-yl), 4-oxo-cyclohexyl (i.e. 4-oxocyclohexan-1-yl), 4-(hydroxyimino)cyclohexyl (i.e. 4-(hydroxyimino)cyclohexan-1-yl), 4-(C_{1-2} alkoxyimino)cyclohexyl, 1-methylcyclohexyl or 3-methylcyclohexyl.
16. A compound or salt as claimed in any preceding claim, wherein, where R^3 is optionally substituted mono-unsaturated- C_{5-7} cycloalkenyl, then R^3 is optionally substituted mono-unsaturated- C_6 cycloalkenyl (i.e. optionally substituted mono-unsaturated-cyclohexenyl), and wherein the R^3 cycloalkenyl is optionally substituted with one or two substituents being fluoro or methyl.
17. A compound or salt as claimed in any preceding claim, wherein, where R^3 is the heterocyclic group of sub-formula (aa), (bb) or (cc), then Y is O, S, SO_2 , NH or N-C(O)methyl.
18. A compound or salt as claimed in any preceding claim, wherein, where R^3 is the heterocyclic group of sub-formula (aa), (bb) or (cc), then Y is O.
19. A compound or salt as claimed in any preceding claim, wherein R^{10} is a hydrogen atom (H) or C(O)methyl.
20. A compound or salt as claimed in any preceding claim, wherein where R^3 is the heterocyclic group of sub-formula (aa), (bb) or (cc), then R^3 is the heterocyclic group of sub-formula (bb) and n^1 is 1.
21. A compound or salt as claimed in any preceding claim, wherein, in R^3 , the heterocyclic group of sub-formula (aa), (bb) or (cc) is unsubstituted (wherein, where Y is NR^{10} , R^{10} is not classified as a substituent).
22. A compound or salt as claimed in any of claims 1 to 21, wherein, in the R^3 heterocyclic group of sub-formula (aa), (bb) or (cc), the one or two optional substituents is or are oxo (=O).
23. A compound or salt as claimed in any preceding claim, wherein

when R^3 is the heterocyclic group of sub-formula (aa) then Y is O, S, SO_2 or NH, and

when R^3 is the heterocyclic group of sub-formula (bb) and Y is NR^{10} , then R^{10} is not C_{1-4} alkyl, C_{1-2} fluoroalkyl or $CH_2C(O)NH_2$.

24. A compound or salt as claimed in any preceding claim, wherein, where R^3 is a bicyclic group of sub-formula (dd) or (ee), then R^3 is of sub-formula (ee) wherein Y^1 , Y^2 and Y^3 are all CH_2 .

25. A compound or salt as claimed in any preceding claim, wherein NHR^3 is of sub-formula (a), (a1), (b), (c), (c 1), (c 2), (c 3), (c 4), (c 5), (c 6), (c 7), (d), (e), (f), (g), (g1), (g2), (g3), (g4), (h), (i), (j), (k), (k1), (L), (m), (m1), (m2), (m3), (m4), (m5), (n), (o), (o1), (o2), (o3), (o4), (o5), (p), (p1), (p2), (p3), (p4), (p5), (p6), (p7), (p8) or (q):



26. A compound or salt as claimed in claim 25, wherein NHR^3 is of sub-formula (c), (c1), (c 2), (c 3), (c 4), (c 5), (c 6), (c 7), (d), (e), (f), (g1), (g4), (h), (i), (j), (k), (k1), (L), (m), (m1), (m2), (m3), (m5), (n), (o), (o1), (o2), (o3), (o4), (o5), (p), (p2), (p3), (p5), (p6), (p7) or (q).

27. A compound or salt as claimed in claim 25, wherein NHR^3 is of sub-formula (c), (d), (e), (f), (g1), (h), (i), (j), (k), (m), (m1), (n), (o), (o1), (p), or (q).

28. A compound or salt as claimed in claim 26 or 27, wherein NHR^3 is of sub-formula (c), (c1), (c 4), (c 5), (h), (i), (j), (k), (m1), (m2), (n), (o), (o2), (o3), (p2), (p5), (p6) or (q).

29. A compound or salt as claimed in claim 26 or 27, wherein NHR^3 is of sub-formula (c), (h), (k), (n), (o) or (o2).

30. A compound or salt as claimed in claim 25, wherein R^3 is tetrahydro-2H-pyran-4-yl; that is NHR^3 is of sub-formula (h).

31. A compound or salt as claimed in any preceding claim, wherein X is NR^4R^5 .

32. A compound or salt as claimed in any preceding claim, wherein R^4 is a hydrogen atom (H), $\text{C}_{1-4}\text{alkyl}$, $-(\text{CH}_2)_n^3\text{-OH}$ or $-(\text{CH}_2)_n^3\text{-NR}^{12}\text{R}^{13}$ wherein n^3 is 2 and R^{12} and R^{13} independently are H or C_1alkyl .

33. A compound or salt as claimed in any preceding claim, wherein R^4 is a hydrogen atom (H).

34. A compound or salt as claimed in any preceding claim, wherein R^5 is:
 $\text{C}_{1-8}\text{alkyl}$;
 $\text{C}_{1-3}\text{fluoroalkyl}$;
 $\text{C}_{3-8}\text{cycloalkyl}$ (unsubstituted);
unsubstituted $-(\text{CH}_2)_n^4\text{-C}_{5-6}\text{cycloalkyl}$ wherein n^4 is 1 or 2;
 $-(\text{CH}_2)_n^5\text{-R}^{11}$ wherein n^5 is 2 or 3, and each substituent R^{11} , independently of any other R^{11} substituent present, is $\text{C}_{1-4}\text{alkoxy}$, $-\text{NR}^{15}\text{-C(O)-NH-R}^{15}$, or $-\text{NR}^{15}\text{-SO}_2\text{R}^{16}$, and any R^{11} substituent which is alkoxy is not substituted at any carbon atom, of the R^5 substituted alkyl, which is bonded to the nitrogen of NR^4R^5 ;
or
 $-(\text{CH}_2)_n^{11}\text{-C(O)R}^{16}$; $-(\text{CH}_2)_n^{12}\text{-C(O)NR}^{12}\text{R}^{13}$; $-(\text{CH}_2)_n^{12}\text{-C(O)OR}^{16}$;
 $-(\text{CH}_2)_n^{12}\text{-SO}_2\text{-NR}^{12}\text{R}^{13}$; $-(\text{CH}_2)_n^{12}\text{-SO}_2\text{R}^{16}$; or $-(\text{CH}_2)_n^{12}\text{-CN}$ wherein n^{11} is 1 or 2 and n^{12} is 1 or 2.

35. A compound or salt as claimed in any of claims 1 to 33, wherein R^5 is $-(CH_2)_n^{13}$ -Het, n^{13} is 0, 1 or 2, and Het is a 5- or 6-membered saturated heterocyclic ring.
36. A compound or salt as claimed in any of claims 1 to 33, wherein R^5 is phenyl optionally substituted with, independently, one or two of: a halogen atom; C_{1-2} alkyl; C_{1-2} fluoroalkyl; C_{1-2} alkoxy; trifluoromethoxy; C_{1-2} alkylsulphonyl (C_{1-2} alkyl-SO₂-); C_{1-2} alkyl-SO₂-NH-; R^7R^8N -SO₂-; R^7R^8N -CO-; -NR¹⁵-C(O)R¹⁶; R^7R^8N ; OH; C_{1-2} alkoxymethyl; C_{1-2} alkyl-SO₂-CH₂-; cyano (CN); or phenyl optionally substituted by one of fluoro, C_{1-2} alkyl, C_1 fluoroalkyl, C_{1-2} alkoxy or C_1 fluoroalkoxy.
37. A compound or salt as claimed in claim 35, wherein R^5 is phenyl optionally substituted with one or two of: a halogen atom, C_{1-2} alkyl, trifluoromethyl, C_{1-2} alkoxy, trifluoromethoxy, R^7R^8N -SO₂-, R^7R^8N -CO-, or C_{1-2} alkyl-SO₂-CH₂-.
38. A compound or salt as claimed in any of claims 1 to 33, wherein R^5 has the sub-formula (x) or (y) or (y1) or (z).
39. A compound or salt as claimed in any of claims 1 to 33, wherein R^5 has the sub-formula (x).
40. A compound or salt as claimed in any preceding claim, wherein $n = 1$, $m = 1$, and $r = 1$.
41. A compound or salt as claimed in any preceding claim, wherein, in sub-formula (x), (y) and/or (y1): none, one or two of A, B, D, E and F are nitrogen; none, one, two or three of A, B, D, E and F are CR⁶; and the remaining of A, B, D, E and F are CH.
42. A compound or salt as claimed in claim 41, wherein, in sub-formula (x), (y) and/or (y1), none or one of A, B, D, E and F are nitrogen.
43. A compound or salt as claimed in any preceding claim, wherein in sub-formula (x), (y), (y1) and/or (z), each R⁶, independently of any other R⁶ present, is a fluorine, chlorine, bromine or iodine atom, methyl, ethyl, n-propyl, isopropyl, C_4 alkyl, trifluoromethyl, -CH₂OH, methoxy, ethoxy, C_1 fluoroalkoxy, OH, C_{1-3} alkylS(O)₂-, C_{1-3} alkylS(O)₂-NH-, Me₂N-S(O)₂-, H₂N-S(O)₂-, -CONH₂, -CONHMe, -CO₂H, cyano (CN), NMe₂, t-butoxymethyl, or C_{1-3} alkylS(O)₂-CH₂-.
44. A compound or salt as claimed in claim 43, wherein in sub-formula (x), (y), (y1) and/or (z), each R⁶, independently of any other R⁶ present, is a fluorine, chlorine

or bromine atom, methyl, ethyl, n-propyl, isopropyl, trifluoromethyl, -CH₂OH, methoxy, difluoromethoxy, methylsulphonyl, methyl-SO₂-NH- or methyl-SO₂-CH₂-.

45. A compound or salt as claimed in any preceding claim, wherein R⁵ is of sub-formula (x) and is: benzyl, (monoalkyl-phenyl)methyl, [mono(fluoroalkyl)-phenyl]methyl, (monohalo-phenyl)methyl, (monoalkoxy-phenyl)methyl, [mono(methyl-SO₂-NH-)-phenyl]methyl, [mono(methyl-SO₂-)-phenyl]methyl, (dialkyl-phenyl)methyl, (monoalkyl-monohalo-phenyl)methyl, [mono(fluoroalkyl)-monohalo-phenyl]methyl, (dihalo-phenyl)methyl, or (dialkoxy-phenyl)methyl.

46. A compound or salt as claimed in claim 1, which is:

Ethyl 4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1-methylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1-acetylpiperidin-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 Ethyl 4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
 N-Benzyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclopentyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 4-(Cyclohexylamino)-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclopentyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 4-[(1-Acetylpiperidin-4-yl)amino]-N-cyclopentyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclopentyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-amine,

N-Cyclohexyl-1-ethyl-5-(pyrrolidin-1-ylcarbonyl)-1H-pyrazolo[3,4-b]pyridin-4-amine,
1-Ethyl-5-(pyrrolidin-1-ylcarbonyl)-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,
4-(Cyclopentylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(pyridin-4-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopentylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-ethylbutyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-ethylbutyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(2-ethylbutyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-n-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-n-propyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(1-methylpiperidin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-1-ethyl-N-(pyridin-4-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

N-Benzyl-4-(cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Ethylbutyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(4-Fluorophenyl)-1-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopentylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-benzyl-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-(2-ethylbutyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetylpiperidin-4-yl)amino]-N-(4-fluorophenyl)-1-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N,N-dimethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-isopropyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-(cyclopropylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-[(1,1-dioxidotetrahydrothien-3-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-4-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-(4-fluorophenyl)-4-[(3S)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-[(3R)-tetrahydrofuran-3-ylamino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-thiopyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydrothien-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclopropylamino)-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1,1-Dioxidotetrahydrothien-3-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1,1-Dioxidotetrahydro-2H-thiopyran-4-yl)amino]-1-ethyl-N-(4-fluorophenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
tert-Butyl (1-[[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]piperidin-3-yl)methylcarbamate,
1-Ethyl-N-[3-(methylsulfonyl)benzyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-5-{[5-methoxy-6-(trifluoromethyl)-2,3-dihydro-1H-indol-1-yl]carbonyl}-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,
N-[(5-Chloropyridin-2-yl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(4-Chlorobenzyl)-1-ethyl-N-isopropyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-Chlorobenzyl)-1-ethyl-N-(2-hydroxyethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(5-methyl-3-phenylisoxazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-*tert*-Butoxyethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-*N*-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(pyrimidin-4-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(2-methyl-1,3-thiazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[3-(*tert*-Butoxymethyl)benzyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{2-[methyl(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(pyrazin-2-ylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-5-{[4-(pyridin-2-ylcarbonyl)piperazin-1-yl]carbonyl}-N-tetrahydro-2H-pyran-4-yl-1H-pyrazolo[3,4-b]pyridin-4-amine,

N-(2-Chloro-6-fluorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(6-oxo-1,6-dihydropyridin-3-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[3-(Aminocarbonyl)benzyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{4-[(methylamino)carbonyl]phenyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[2-(1-methyl-1*H*-imidazol-4-yl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-{2-[(Anilino)carbonyl]amino}ethyl-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(1*H*-tetraazol-5-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[2-(1*H*-1,2,4-triazol-1-yl)ethyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
tert-Butyl 2-[[[1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl](methylamino)ethyl]carbamate,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[4-(trifluoromethyl)phenyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
tert-Butyl 4-([1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl)amino)piperidine-1-carboxylate,
1-Ethyl-*N*-{3-[(methylsulfonyl)amino]propyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[2-(Dimethylamino)benzyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(1-ethylpyrrolidin-2-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(tetrahydrofuran-2-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-ethyl-*N*-tetrahydro-2*H*-pyran-4-yl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-{4-[(Dimethylamino)sulfonyl]benzyl}-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{3-[(methylsulfonyl)amino]benzyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-[[1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl]piperidine-2-carboxamide,
1-Ethyl-*N*-(4-methoxyphenyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[3-(2-oxopyrrolidin-1-yl)propyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[2-(1-methylpyrrolidin-2-yl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(pyridin-3-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(1-methylpiperidin-4-yl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(1-ethylpropyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

1-Ethyl-*N*-(2-piperidin-1-ylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(3-morpholin-4-ylpropyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3-Ethoxypropyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(Cyclohexylmethyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[3-(Dimethylamino)propyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-neopentyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-ethyl-*N*-(4-methoxybenzyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{2-[(phenylsulfonyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[2-(Acetylamino)ethyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{2-[(methylsulfonyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-methyl-*N*-(pyridin-4-ylmethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{2-[(2-methoxyphenyl)(methyl)amino]ethyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(2-oxo-2-phenylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(2,5-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-[4-(trifluoromethyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N,1-Diethyl-*N*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Cyclopropyl-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(2-amino-2-oxoethyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-(3-methoxyphenyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3,4-Difluorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Ethyl 3-({[1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl}amino)propanoate,
N-(1-Benzylpiperidin-4-yl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Butyl-4-{[1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl}piperazine-1-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-(1,3,4-thiadiazol-2-yl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(2,3-Dihydro-1*H*-inden-2-yl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

1-Ethyl-*N*-[2-(2-oxoimidazolidin-1-yl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3,4-Dimethoxybenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(3-Chlorobenzyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-5-[(4-methylpiperazin-1-yl)carbonyl]-*N*-tetrahydro-2*H*-pyran-4-yl-1*H*-pyrazolo[3,4-*b*]pyridin-4-amine,
1-Ethyl-*N*-(2-hydroxyethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-5-[[4-(4-methoxyphenyl)piperazin-1-yl]carbonyl]-*N*-tetrahydro-2*H*-pyran-4-yl-1*H*-pyrazolo[3,4-*b*]pyridin-4-amine,
1-Ethyl-*N*-{4-[(methylsulfonyl)methyl]phenyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[3-(dimethylamino)-3-oxopropyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(1-methyl-1*H*-imidazol-5-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-{4-[(methylamino)sulfonyl]phenyl}-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(2-Cyanoethyl)-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-methyl-*N*-[(5-methyl-1,3,4-oxadiazol-2-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(1-methyl-1*H*-pyrazol-4-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-methyl-*N*-[(1-methyl-1*H*-imidazol-2-yl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-*N*-(2-thien-2-ylethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-[2-(4-Chlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[2-(2-methoxyphenyl)ethyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Ethyl 4-(cyclohexylamino)-1-(3-ethoxy-3-oxopropyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 1-(2-hydroxyethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
N-[4-(Methylsulfonyl)benzyl]-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-(4-Fluorophenyl)-1-*n*-propyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Ethyl 1-ethyl-6-methyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 4-(cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
4-(Cyclohexylamino)-1-ethyl-6-methyl-*N*-[4-(methylsulfonyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

N-Benzyl-4-(cyclohexylamino)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-*N*-(4-fluorophenyl)-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-6-methyl-*N*-[4-(trifluoromethyl)benzyl]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cyclohexylamino)-*N*-(2,3-dihydro-1*H*-inden-2-yl)-1-ethyl-6-methyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-6-methyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(2-oxoazepan-3-yl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(3-hydroxycyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(3-hydroxycyclopentyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
N-Benzyl-1-ethyl-4-[(4-oxocyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

1-Ethyl-*N*-(2-hydroxy-1-methylethyl)-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
Methyl (2*S*)-2-([1-ethyl-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridin-5-yl]carbonyl)amino)-3-hydroxypropanoate,

Ethyl 1-ethyl-4-[(4-hydroxycyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 1-ethyl-4-[(4-oxocyclohexyl)amino]-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 4-[(1-acetyl-4-piperidiny)amino]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl 4-[(4-aminocyclohexyl)amino]-1-ethyl-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxylate,
Ethyl-*N*-[(1-oxido-3-pyridinyl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(1-oxido-2-pyridinyl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-*N*-[(1-oxido-4-pyridinyl)methyl]-4-(tetrahydro-2*H*-pyran-4-ylamino)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-[(*cis*-4-Aminocyclohexyl)amino]-1-ethyl-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cyclobutylamino)-1-ethyl-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-(Cycloheptylamino)-1-ethyl-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-[(4-methylcyclohexyl)amino]-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-[(3-methylcyclohexyl)amino]-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-[(1-methylcyclohexyl)amino]-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-[(1*R*,2*R*,4*S*)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
4-[(1*R*,2*S*,4*S*)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,
1-Ethyl-4-[(3*S*)-2-oxo-3-pyrrolidinyl]amino)-*N*-(phenylmethyl)-1*H*-pyrazolo[3,4-*b*]pyridine-5-carboxamide,

4-[(2,5-Dioxo-3-pyrrolidinyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(1-Azabicyclo[2.2.2]oct-3-ylamino)-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(1-methylcyclohexyl)amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclobutylamino)-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cycloheptylamino)-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(4-methylcyclohexyl)amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(3-methylcyclohexyl)amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(cis-4-Aminocyclohexyl)amino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cycloheptylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclobutylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(4-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(3-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(1-methylcyclohexyl)amino]-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(cis-4-Aminocyclohexyl)amino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cycloheptylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclobutylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(3-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(4-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2R,4S)-Bicyclo[2.2.1]hept-2-ylamino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1R,2S,4S)-Bicyclo[2.2.1]hept-2-ylamino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(1-methylcyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

4-[(cis-4-Aminocyclohexyl)amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{4-[(methylsulfonyl)methyl]phenyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2,4-Dimethylphenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(3,4-Dimethylphenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(3,4-Dichlorophenyl)methyl]-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{[4-(methyloxy)phenyl]methyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{{4-[(Dimethylamino)phenyl]methyl}-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{{4-[(Difluoromethyl)oxy]phenyl}methyl}-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-{{4-[(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{{4-[(methylsulfonyl)phenyl]methyl}-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-(2-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(1-Acetyl-4-piperidiny)-1-ethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N,1-Diethyl-4-[(4-oxocyclohexyl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-[(4-oxocyclohexyl)amino]-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{{4-[(Difluoromethyl)oxy]phenyl}methyl}-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-N-{{4-[(trifluoromethyl)phenyl]methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{{4-[(methylsulfonyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{{4-[(methylsulfonyl)methyl]phenyl}-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-pyridinylmethyl)-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(1-Acetyl-4-piperidiny)-1-ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

N,1-Diethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(4,4-Difluorocyclohexyl)amino]-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-[(4-fluoro-3-cyclohexen-1-yl)amino]-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(3,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[(3-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(3,4-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[[3-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[[4-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2,6-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(3-chlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[4-(methyloxy)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(4-[(dimethylamino)sulfonyl]phenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[[2-(dimethylamino)phenyl]methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[(2-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(2-chloro-6-fluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[[4-[(difluoromethyl)oxy]phenyl]methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[[3-chloro-4-(methyloxy)phenyl]methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-[(5-chloro-2-pyridinyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-(5-chloro-2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-(1,3-thiazol-2-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-[[4-(methylsulfonyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-(2,2-diphenylethyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({4-[(methylsulfonyl)amino]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({4-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-{{4-(aminosulfonyl)phenyl}methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-({3-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-N-{{4-(aminocarbonyl)phenyl}methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[(1-Acetyl-4-piperidinyl)amino]-1-ethyl-N-{{6-(methyloxy)-3-pyridinyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-4-piperidinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-piperidinylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(ethylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{1-[(1-methylethyl)sulfonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[1-(Cyclopentylsulfonyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(methylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{1-[(phenylmethyl)sulfonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(phenylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(propylsulfonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[1-(Cyclopropylcarbonyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(3-furanylcarbonyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[1-(3,3-Dimethylbutanoyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(2-ethylbutanoyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[1-(Cyclopentylacetyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(2-methylpropanoyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[1-(tetrahydro-2H-pyran-4-ylcarbonyl)-4-piperidinyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(1-propanoyl-4-piperidinyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[1-(N-Acetylglucyl)-4-piperidinyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(4-morpholinylacetyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{1-[(4-oxocyclohexyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[1-(1-piperidinylacetyl)-4-piperidinyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-{1-[(1-methyl-5-oxo-3-pyrrolidinyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{1-[(3-methyl-3-oxetanyl)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{1-[(4-fluorophenyl)acetyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{[1-(3,3-Dimethylbutanoyl)-4-piperidinyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{[1-(Cyclopentylacetyl)-4-piperidinyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{[1-(Cyclopropylcarbonyl)-4-piperidinyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({1-[(4-oxocyclohexyl)carbonyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({1-[(4-fluorophenyl)acetyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({1-[(1-methyl-5-oxo-3-pyrrolidinyl)carbonyl]-4-piperidinyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Methyl 3-[(1-ethyl-5-[(phenylmethyl)amino]carbonyl)-1H-pyrazolo[3,4-b]pyridin-4-yl)amino]cyclohexanecarboxylate,
3-[(1-Ethyl-5-[(phenylmethyl)amino]carbonyl)-1H-pyrazolo[3,4-b]pyridin-4-yl)amino]cyclohexanecarboxylic acid,
1-Ethyl-N-(phenylmethyl)-4-(4-piperidinylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Ethyl 1-ethyl-4-({1-[(methyloxy)acetyl]-4-piperidinyl}amino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
Ethyl 1-(1-methylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxylate,
4-(Cyclohexylamino)-1-ethyl-N-methyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluorophenyl)-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-6-methyl-N-([4-(methylsulfonyl)phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2,3-Dihydro-1H-inden-2-yl)-1-ethyl-6-methyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(1-piperidinylcarbonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(1-methylethyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(2-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{3-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{4-[(Difluoromethyl)oxy]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{4-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(4-morpholinyl)-2-(trifluoromethyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-4-pyridinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{4-[(4-methyl-1-piperazinyl)carbonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-[2-(2-oxo-1-pyrrolidinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{3-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{3-[(methylsulfonyl)amino]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(4-fluoro-2-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(4-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-Chloro-2-cyanophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(1-piperidinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[Acetyl(methyl)amino]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(4-morpholinylcarbonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(4-Chloro-3-cyanophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(3-hydroxyphenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[3-[(Acetylamino)methyl]-4-(methyloxy)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(1-piperidinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-{[(Cyclohexyl(methyl)amino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-(4-morpholinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{3-[(Acetylamino)sulfonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-Chloro-4-hydroxyphenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-[(methylsulfonyl)amino]phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-[(methylamino)carbonyl]phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[3-(trifluoromethyl)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-3-pyridinyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3,4-Dichlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[3-(Aminosulfonyl)-4-chlorophenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(4-morpholinyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-[4-(4-morpholinylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{2-[(4-methyl-1-piperazinyl)carbonyl]phenyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-Chloro-4-(trifluoromethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[(Acetylaminomethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Chlorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(3-Chloro-2-fluorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(3-fluorophenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Cyano-3-fluorophenyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(propylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{4-[(Dimethylamino)carbonyl]phenyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[4-(methylsulfonyl)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{4-[(Acetylaminomethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-3-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-(Aminosulfonyl)ethyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(2-Amino-2-oxoethyl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-{2-[(methylsulfonyl)amino]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(tetrahydro-2H-pyran-4-yl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(1-methyl-1H-pyrazol-4-yl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[3-(methylsulfonyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[[3-(Aminocarbonyl)phenyl]methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(tetrahydro-2-furanylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-({4-[(dimethylamino)sulfonyl]phenyl}methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(5-Chloro-2-pyridinyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[4-(methylsulfonyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[6-(methyloxy)-3-pyridinyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-{4-[(methylamino)carbonyl]phenyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-({3-[(methylamino)carbonyl]phenyl}methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

N-[[4-(Aminocarbonyl)phenyl]methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(4-hydroxyphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(3,4-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[4-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-([3-[(methylsulfonyl)amino]phenyl]methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(2,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(4-methylphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(2-{4-[(methylsulfonyl)amino]phenyl}ethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(2-hydroxyphenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(3,4-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(3,5-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(2-phenylethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[2-(methylsulfinyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[2-(4-hydroxyphenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-[4-(Aminosulfonyl)phenyl]ethyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-([2-[(methylamino)carbonyl]phenyl]methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[2-(methylsulfonyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Methyl 2-[[[4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino]methyl]benzoate,
4-(Cyclohexylamino)-1-ethyl-N-[2-[4-(methylsulfonyl)phenyl]ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[4,5-Bis(methyloxy)-2,3-dihydro-1H-inden-2-yl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[[2-fluoro-3-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(3,4-dimethylphenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[2-(4-fluorophenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[2-(4-methylphenyl)ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[2-[4-(methyloxy)phenyl]ethyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(2-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,

4-(Cyclohexylamino)-N-[(3,5-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-1-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[[4-(dimethylamino)phenyl]methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
4-(Cyclohexylamino)-1-ethyl-N-[(2-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[[2,4-Bis(methoxy)phenyl]methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(6-Chloro-2-pyridinyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
N-({2-[Acetyl(methyl)amino]phenyl}methyl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
4-(Cyclohexylamino)-1-ethyl-N-[[4-fluoro-3-(trifluoromethyl)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(1R)-2,3-dihydro-1H-inden-1-yl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(2,6-dichlorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Methyl 3-[[{4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl}carbonyl]amino)methyl]benzoate,
4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Methyl 4-[[{4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl}carbonyl]amino)methyl]benzoate,
4-(Cyclohexylamino)-1-ethyl-N-(1H-tetrazol-5-ylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-({4-[(difluoromethyl)oxy]phenyl}methyl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(2-methyl-1,3-thiazol-4-yl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2-Chloro-6-fluorophenyl)methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[[2-(Aminocarbonyl)phenyl]methyl]-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-{{2-(dimethylamino)phenyl}methyl}-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(4-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-{{3-(trifluoromethyl)phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-N-[(2,6-difluorophenyl)methyl]-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[(3-fluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-{{2-(trifluoromethyl)phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(5-Chloro-2,3-dihydro-1H-inden-2-yl)-4-(cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-{{4-[(methylamino)carbonyl]phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-[4-(methoxy)phenyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

4-(cyclohexylamino)-1-ethyl-N-[(6-oxo-1,6-dihydro-3-pyridinyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-(Cyclohexylamino)-1-ethyl-N-(3-pyridinylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
4-[[[4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino)methyl]benzoic acid,
3-[[[4-(Cyclohexylamino)-1-ethyl-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino)methyl]benzoic acid,
4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide hydrochloride,
4-(Cyclohexylamino)-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide methanesulphonate,
N-({2-[(1,1-Dimethylethyl)oxy]-3-pyridinyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
N-[(3-Chloro-4-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(4-Chloro-2-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-({2-[(Difluoromethyl)oxy]phenyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({2-[(1-methylethyl)oxy]phenyl)methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-({3-[(1-methylethyl)oxy]phenyl)methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-({3-[(Difluoromethyl)oxy]phenyl)methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[[4-hydroxy-3-(methyloxy)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(5-Acetyl-2-hydroxyphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-{2-[3-(trifluoromethyl)phenyl]ethyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[[4-(Acetylamino)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-(3-hydroxyphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-(3-Chlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-(2-{4-[(trifluoromethyl)oxy]phenyl}ethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-{2-[3-(methyloxy)phenyl]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-(4-Acetylphenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-(3,4-Dichlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[3-(Aminosulfonyl)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[3,4-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[2-(2,3-Dichlorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-{2-[3,5-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-{2-[3-methyl-4-(methyloxy)phenyl]ethyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[2-(2,6-Difluorophenyl)ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-{2-[2,6-Bis(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[2-(2-methylphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(3,4-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[4,5-Bis(methyloxy)-2,3-dihydro-1H-inden-2-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[2-[4-(Aminosulfonyl)phenyl]ethyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[(2-(methylsulfinyl)phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-(2-phenylethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(4-(Dimethylamino)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[2-(4-fluorophenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[2-(4-methylphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(3-(Aminosulfonyl)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[(4-methylphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[(4-fluoro-3-(trifluoromethyl)phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 Methyl 2-[(1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl]amino)methyl]benzoate,
 N-[(6-Chloro-2-pyridinyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 N-(2,3-Dihydro-1H-inden-1-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(2-[Acetyl(methyl)amino]phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(1S)-2,3-Dihydro-1H-inden-1-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(1R)-2,3-Dihydro-1H-inden-1-yl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[(3-[(methylsulfonyl)amino]phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-(phenylmethyl)-N-propyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[2-(Dimethylamino)ethyl]-1-ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Butyl-1-ethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N,1-Diethyl-N-(phenylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-(1-phenyl-4-piperidinyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-ethyl-N-{1-[(ethylamino)carbonyl]-4-piperidinyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 Formic acid - 1-ethyl-N-[1-methyl-2-(4-methyl-1-piperazinyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide (1:1),
 Methyl [4-({[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)-1-piperidinyl]acetate,
 1-Ethyl-N-{[4-(4-morpholinylmethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 1-Ethyl-N-({3-[(4-methyl-1-piperazinyl)methyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 N-{[5-(Aminocarbonyl)-3-pyridinyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 1-Ethyl-N-{[4-(1-methylethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-{[3-(Cyclopentyloxy)-4-(methyloxy)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-({4-[(4-methyl-1-piperazinyl)methyl]phenyl}methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 N-[(2,4-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(2,4-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(2-Chloro-4-fluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-{2-[2-Chloro-3-(methyloxy)phenyl]ethyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 Methyl 3-({[1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl}amino)methyl]benzoate,
 1-Ethyl-N-{[3-(1-pyrrolidinylmethyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide trifluoroacetate,
 1-Ethyl-N-(2-{4-[(methylsulfonyl)amino]phenyl}ethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-{[2,5-Bis(methyloxy)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-{[2,6-Bis(methyloxy)phenyl]methyl}-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-[(2-fluorophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(3,5-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-[(4-Chlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-Cyclohexyl-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-(2-[4-(methylsulfonyl)phenyl]ethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-([2-fluoro-3-(trifluoromethyl)phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 N-({4-[(Cyclopropylamino)carbonyl]phenyl}methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-{[4-(4-methyl-1-piperazinyl)phenyl]methyl}-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
 1-Ethyl-N-([4-(1-pyrrolidinylmethyl)phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,

1-Ethyl-N-[6-(methyloxy)-1-oxo-2,3-dihydro-1H-inden-2-yl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2,5-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(3,5-Diethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,,
N-[(2,3-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(2-(methylsulfonyl)phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(3-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(3,5-Bis(methyloxy)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-(4-hydroxyphenyl)ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(3,5-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2,4-Bis(methyloxy)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(2-(methyloxy)phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2,4-Dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(2-[(methylamino)carbonyl]phenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[2-[4-(methyloxy)phenyl]ethyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(2-Chlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[(2-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(1,3-Benzodioxol-5-ylmethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-[3-(methyloxy)phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-(Cyclohexylmethyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
1-Ethyl-N-(1,2,3,4-tetrahydro-1-naphthalenyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
Methyl 4-[(1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl)carbonyl]amino)methyl]benzoate,
N-[(3,4-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide,
N-[(4-(Aminocarbonyl)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2,6-Difluorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(3-(Aminocarbonyl)phenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[(4-hydroxyphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[(6-(methyloxy)-3-pyridinyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

1-Ethyl-N-(2-pyridinylmethyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-([3-(trifluoromethyl)phenyl]methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[4-(2-Amino-2-oxoethyl)phenyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([4-[(methylamino)carbonyl]phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[4-[2-(methylamino)-2-oxoethyl]phenyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([3-fluorophenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([4-[(methylsulfonyl)amino]phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([4-(Aminosulfonyl)phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([2-(Aminocarbonyl)phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([4-[(Difluoromethyl)oxy]phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([3-[(Dimethylamino)methyl]phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([3-Chloro-4-(methyloxy)phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-(1-Acetyl-4-piperidinyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-([2-(trifluoromethyl)phenyl]methyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-(5-Chloro-2,3-dihydro-1H-inden-2-yl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([3-[(Acetylamino)methyl]phenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([4-fluorophenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([4-fluoro-2-(trifluoromethyl)phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([2-ethylphenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-([2-fluoro-5-(trifluoromethyl)phenyl]methyl)-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[(2,3,4-trifluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([4-Chloro-2-fluorophenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([4-Bromo-2-fluorophenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([3,5-Dimethylphenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([2,3-Dimethylphenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([2,3-Dichlorophenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-([4-Cyanophenyl]methyl)-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

N-[(4-Bromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[5-fluoro-2-(trifluoromethyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[(4-iodophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[[4-(1,1-Dimethylethyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(3-Cyanophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2,6-Dichlorophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(5-Chloro-2-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(3,5-Dibromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[(4-ethylphenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[3-fluoro-4-(trifluoromethyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[(2-iodophenyl)methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2-Bromophenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[4-(hydroxymethyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[3-(hydroxymethyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[3-(hydroxymethyl)-2-methylphenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[[2,3-Dichloro-6-(hydroxymethyl)phenyl]methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2,4-Dichloro-6-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[4-(2-methylpropyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2,5-dimethylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-N-[(2,4,5-trifluorophenyl)methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-[[2-fluoro-4-(trifluoromethyl)phenyl]methyl]-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[(2-Chloro-6-methylphenyl)methyl]-1-ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
4-[[[1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino]methyl]benzoic acid sodium salt
3-[[[1-Ethyl-4-(tetrahydro-2H-pyran-4-ylamino)-1H-pyrazolo[3,4-b]pyridin-5-yl]carbonyl]amino]methyl]benzoic acid
Ethyl 1-ethyl-4-[[4-(hydroxyimino)cyclohexyl]amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
1-Ethyl-4-[[4-(hydroxyimino)cyclohexyl]amino]-N-[[4-(methyloxy)phenyl]methyl]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
N-[[4-(Dimethylamino)phenyl]methyl]-1-ethyl-4-[[4-(hydroxyimino)cyclohexyl]amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide

1-Ethyl-4-({4-[(ethyloxy)imino]cyclohexyl}amino)-N-{{4-(methyloxy)phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-4-({4-[(methyloxy)imino]cyclohexyl}amino)-N-{{4-(methyloxy)phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
4-[(4-{{(1,1-Dimethylethyl)oxy}imino}cyclohexyl)amino]-1-ethyl-N-{{4-(methyloxy)phenyl}methyl}-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
1-Ethyl-N-{{4-(methyloxy)phenyl}methyl}-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
Ethyl 1-ethyl-4-[(7-oxohexahydro-1H-azepin-4-yl)amino]-1H-pyrazolo[3,4-b]pyridine-5-carboxylate
4-{{[cis-4-(Butylamino)cyclohexyl]amino}-N-(2,3-dihydro-1H-inden-2-yl)-1-ethyl-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
4-{{[trans-4-Aminocyclohexyl]amino}-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
4-{{[trans-2-Aminocyclohexyl]amino}-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide
4-{{[cis-2-Aminocyclohexyl]amino}-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide, or
4-{{[3-Aminocyclohexyl]amino}-1-ethyl-N-(phenylmethyl)-1H-pyrazolo[3,4-b]pyridine-5-carboxamide;

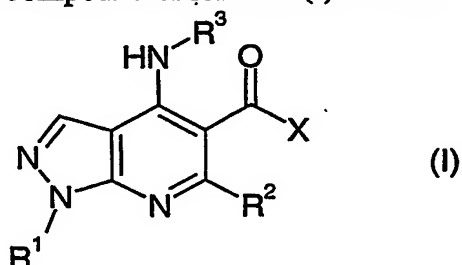
or a salt thereof.

47. A compound or salt as claimed any preceding claim, which is the compound or a pharmaceutically acceptable salt thereof:
48. A compound or salt as claimed any preceding claim, for use as an active therapeutic substance in a mammal such as a human.
49. A pharmaceutical composition comprising a compound of formula (I) or (IA) or (IB), as defined in any of claims 1 to 47, or a pharmaceutically acceptable salt thereof, and one or more pharmaceutically acceptable carriers and/or excipients.
50. A composition as claimed in claim 49, for the treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal such as a human.
51. The use of a compound of formula (I) or (IA) or (IB), as defined in any of claims 1 to 47, or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for the treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal such as a human.
52. A composition or the use as claimed in claim 50 or 51, wherein the composition or medicament is for the treatment and/or prophylaxis of chronic obstructive pulmonary disease (COPD), asthma, or allergic rhinitis in a mammal such as a human.

ABSTRACT

Pyrazolo[3,4-b]pyridine compounds, and their use as phosphodiesterase inhibitors

The invention relates to a compound of formula (I) or a salt thereof:

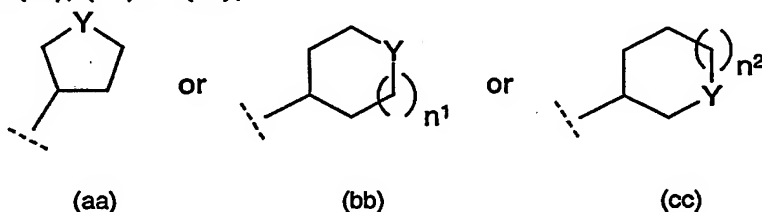


wherein:

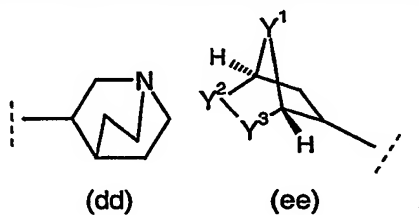
R¹ is C₁₋₄alkyl, C₁₋₃fluoroalkyl, -CH₂CH₂OH or -CH₂CH₂CO₂C₁₋₂alkyl;

R² is a hydrogen atom (H), methyl or C₁fluoroalkyl;

R³ is optionally substituted C₃₋₈cycloalkyl or optionally substituted mono-unsaturated-C₅₋₇cycloalkenyl or an optionally substituted heterocyclic group of sub-formula (aa), (bb) or (cc);



in which n¹ and n² independently are 1 or 2; and in which Y is O, S, SO₂, or NR¹⁰;



or R³ is a bicyclic group (dd) or (ee);

and wherein X is NR⁴R⁵ or OR^{5a}.

The compounds are phosphodiesterase (PDE) inhibitors, in particular PDE4 inhibitors. Also provided is the use of a compound of formula (I), or a pharmaceutically acceptable salt thereof, in the manufacture of a medicament for the treatment and/or prophylaxis of an inflammatory and/or allergic disease in a mammal such as a human, for example chronic obstructive pulmonary disease (COPD), asthma, or allergic rhinitis.